An Address
ON
HIGH BLOOD PRESSURE:
ITS ASSOCIATIONS, ADVANTAGES, AND DISADVANTAGES.

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BY

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Life is correlated in every way with tension of a certain quality—with a force, a pressure that keeps the atoms whirling in organic circles. Lower, beyond a certain point, the pressure with which the blood flows in the medulla, changes the surface tension of the fluid in which a leucocyte swims, or an amoeba crawls, and the atoms of the man, of the leucocyte, and of the amoeba soon cease to swing in organic rhythm, and change to that to which all inorganic matter has been attuned since, in the words of Lucretius, "the atoms fell into such a disposition as those whereby our world of things created holds together."

Blood pressure—the force with which the blood circulates—maintains in organic activity every part of the body. With the five factors concerned in its maintenance I need not detain you. The heart pump supplies a force which the elastic coats of the large arteries store to convert an intermittent into a continuous stream. The small arteries act as sluices or taps regulating the supply to different parts. Over the capillary bed the nutritive fluid is distributed. And there is a drainage system of veins and lymph channels. Life depends on the maintenance of a due pressure in the irrigation fields, to the canals of which Galen first likened the blood vessels: "So it is with the animal body. Many canals dispersed through all its parts convey to them blood, as those of a garden convey moisture, and the intervals separating those canals are wonderfully disposed by Nature in such a way that they should neither lack a sufficient quantity of blood for absorption, nor be overloaded at any time with an excessive supply." On a huge scale, one sees this in a land like Egypt, the very life of which depends on the height of the pressure of water, whether in the annual rise of the Nile, or as it is dammed and stored artificially.

A man's life may be said to be a gift of his blood pressure, just as Egypt is a gift of the Nile (Herodotus). It is interesting to see at first hand how this pressure is kept up in Egypt by the big dams at the Delta, at Assiut, at Esna, and the monster one at Assouan. When raised 15 ft., the last named will give life to another one and a half million acres of dead sand. Along the Nile big steam pumping stations keep certain canals and reservoirs full. For thousands of years, long before dams were built, the patient fellaheen have baled the water from level to level with a bucket at one end of a crossbeam, counterpoised with a weight at the other. Of the three forces which now keep Egypt watered, gravity, steam, and human muscle, the first is the most important. In the human irrigation scheme there is nothing to correspond with this—indeed, gravity in the circulation of all living things is a great obstacle, to overcome which the pump had, in animals at least, to be introduced. The man with the shadoof working on the banks of the Nile, the immediate agent in the old-fashioned plan of irrigation, represents rather the living capillary cell. And the Nile mud itself is alive, not alone in the magic potency which gave man his earliest civilization, but in plastic qualities which enable the fellaheen to build the dykes and dams with canals and rivulets, making every acre a miniature of Egypt itself. In the fields, as in the body, are schemes for distributing the vital fluid, for varying the pressure in different parts, and two all-important things are arranged—the final channels of distribution between the cotton rows or the corn are kept free from weeds and obstructions, and provision is made for drainage, for carrying off the surplus water, to prevent dropsy of the soil.

The whole question of blood pressure is too vast for me to do more than touch upon two points essential to my purpose this evening. The smaller arteries act as stopcocks—taps which regulate the flow to the vascular areas according to requirements. Under the control of various stimuli—vasomotor, hormonic, physical, and postural—they are sluice-gates to be open or shut. The mean pressure in them depends less on the forces of the pump than on the distribution of the blood bulk, the state of the arterial walls, and the state of the capillary bed. So important is distribution that a person may bleed to death into his own vessels, splanchnic or systemic. Hold a hutch rabbit up by the ears, and so much blood accumulates in its splanchnic reservoir that the pressure falls in the smaller arteries of other regions, and the animal dies. The average pressure in the various territories to be irrigated is regulated from the vasomotor centres, just as a man in charge of a big irrigation plant controls the sluices, often nowadays raising or lowering them by simply touching an electric button. In man a mean arterial pressure is maintained—about 125 to 130 mm. of Hg, and 140 to 160 mm. in persons over 50. A permanent pressure above 160 mm. may be called high, but we must not forget the great regional variations pointed out by Leonard Findlay and others.

In the capillary lake into which the arterial stream widens the current slows and the pressure lessens, though on the latter point authorities are not agreed. There are probably great variations. The Nile, when in low water, takes ninety days to flow from Lake Victoria Nyanza to the sea. Between Gondokoro and Khartoum it passes through the great capillary lake known as the Sud, and more than one-half of the time—forty-six days—is taken to pass this short region. But when in flood it takes only fifty days from Lake Victoria Nyanza to the sea, twenty-eight of which are occupied in passing through the Sud. But it is not merely a matter of rate-flow and pressure in the capillary bed; there are two other factors of prime importance. In the brief fraction of a second, and in a short quarter to three-quarters of a millimetre of space, the business of life is transacted, for here is the mart or exchange in which the raw and the manufactured articles from the intestinal and hepatic shops are spread out for sale. The endothelial capillary cell is not a simple dead membrane under the laws of diffusion, but has an active selective power. Playing the part of a middleman, it is everywhere a free trader in the bread stuff of life, oxygen, but a strong protectionist in certain commodities. Thus the renal capillary cell trades in water, salts, urea, and uric acid, but has a high tariff wall against proteins and sugars. In the secretory glands the selective capacity of the capillary wall must be of the first importance, as here the middleman and the retailer are cheek by jowl, and their shops abut, back to back, opening to different streets. These retail shops, represented by the gland and body cells of the capillary areas, do a roaring trade, partly in common commodities—water, oxygen, salts—and partly in special goods made up on the spot for the use of the body. Each cell, factory as well as shop, collects a great deal of dust and rubbish, and special provision is made for getting rid of this, part being dumped back into the common river, and part into a special lymphatic drainage system, which keeps the irrigation fields free from weeds and dirt. The transactions which take place between the middleman (the capillary cell), the factory and shop-people (in the gland or body cell), and the sanitary department (represented by the lymph circulation), are regulated in part by the laws of diffusion and osmosis, and partly by the cell specialists (enzymes of various sorts), some of which, for example, enable the liver cells to make bile, others to make glycogen. All this activity is associated with movement. The force taking the protein molecule through a capillary cell, through the furnace of a muscle cell to make it appear in the lymph space as sarcolactic acid and other organic compounds, is not simple osmosis; but in its working currents caused by the machinery of the cell must set from blood to lymph stream. Though we know very little about it in the animal body, this *vis a fronte*, which Galen compared very aptly to a magnet, is not a negligible quantity. We know of its immense power in plants, and I believe botanists agree that the force which may lift water to a height of 300 feet or more in a tree is a *vis a fronte*, and not a *vis a tergo*. All this is preliminary

to the main topic of my address, the associations' advantages, and disadvantages of a high blood pressure.

Some years ago I wrote a short paper with a somewhat paradoxical title: "The advantages of a trace of albumen and a few tube casts in the urine of men over 50 years of age." It was written with the specific object of allaying the unnecessary fears of physicians obsessed with the old idea that the presence of these bodies in the urine always indicated serious and progressive disease of the kidneys. This bogey has been to a large extent replaced by that of high blood pressure, a knowledge of which has filtered to the laity with the usual disastrous results. A good many people are unnecessarily alarmed, and much needless worry and anxiety has been caused. For example, a robust, full-blooded country girl was taken to a physician for some menstrual disturbance, and was told that her blood pressure was 140, and that the outlook for her was serious. The poor girl, very much depressed, regarded her condition as hopeless, particularly in so far as a married life was concerned. She was a strongly built, plethoric, muscular girl, who only needed the reassurance that with her physique such a pressure was as natural as one of 90 would be in a thin, pale delicate girl.

What are the conditions in which we see permanent high pressure, and what are its advantages and disadvantages? For practical purposes we may consider three groups of cases: Simple high tension, hyperpiesis, without signs of arterial or renal disease; arterio-sclerosis, with the associated high tension, renal, and heart changes; and chronic nephritis, with secondary high pressure, arterio-sclerosis, and heart changes.

I. HYPERPIESIS.

Hyperpiesis signifies simple high pressure without signs of cardio-vascular disease. We have learnt to recognize an average pressure, as taken with ordinary instruments, and the figures given are usually accepted. There are, of course, great variations, usually temporary, but now and again we meet with individuals whose pressure is permanently high—above 180—without, so far as can be ascertained, arterial, cardiac, or renal disease. Of course the difficulty is to exclude internal, not discernible, alterations in the splanchnic and other vessels, since, as is well known, vascular disease may be very localized, but, clinically, the group, well defined and very important, has been carefully studied by Allbutt and others. We see the condition most often in men who work hard, drink hard, and smoke hard, particularly in keen business men with heavy responsibilities, and we see it now and then in neurasthenic and gouty persons. Let me give a few illustrative cases:

A man just over 40 years of age, 13 st. 7 lb. in weight, of excellent family history and no syphilis, had lived a business life of the greatest possible intensity. Early successful, he began to speculate, and made and lost several fortunes, lived "high," as the saying is, smoked eight to ten cigars and several cigarettes in the day, took a dozen drinks of Scotch whisky, always champagne at dinner, and with it all found time for a moderate amount of exercise, chiefly riding. In short, he lived the "hustling" life of Wall Street. He regarded himself as "hard as nails," nothing could hurt him. The ill effects of the night disappeared with the morning cold bath. He was always ready for his breakfast, and sharp as a hawk for business at 9 o'clock in the morning. Suddenly one day, without warning, after a heavy dinner, he lost the power of speech, and for nearly three days was confused in his head and could not express himself intelligently. There was no paralysis of face or arm, and at the end of a week he was quite himself again. A trace of albumen and a few tube casts were found in the urine, and he had a blood pressure of 212. Of course this was a terrible shock. He gave up business, went to Carlsbad and various health resorts. I saw him just a year after the attack. He was still very apprehensive and worried, and had had a few attacks of pain about his heart after exertion. He was a big, healthy-looking man, of good colour and good physique. Careful examination showed no alteration in any of his viscera. The pulse was 80. Both the radials and temporals could be rolled under the finger, and the pulse could be felt just as well on the distal side of the pressure. Compressing a section of the radial at a distance of 2 in. apart, the intervening portion of the vessel full of blood felt firm, and could be readily rolled under the finger. If, however, with gentle pressure, the blood column was forced out of about 2 in. of the radial, its wall could not be felt or differentiated in any way from the tissues about it. The same held good for the temporal. With a similar experiment it was not easy to feel the wall of a brachial artery. The retinal arteries looked large and full, but they did not compress the veins specially. The apex beat was not outside the nipple line. The cardiac flatness was not increased, but there was a snapping, valvular aortic second sound. The systolic blood pressure was 235. No difference in the recumbent position and after exertion. The specific gravity of the urine was 1020, and at times there had been a slight trace of albumen. There was none when I first saw him. There were no tube casts.

Here was a man whose arteries, as far as one could make out, had not thickened palpably, certainly not beyond his age. His heart was not hypertrophied, but he had a very high blood pressure, and he had had one of those peculiar but not very uncommon attacks of aphasia in connexion with it.

It is interesting, sometimes distressing, to see a man of great vigour, in the prime of life, full of work and energy, in the first shock of the realization that he is a machine, with the works of which there is something radically wrong.

A fine strapping fellow of 48, a lawyer of distinction, and among his friends a boon companion, full of work, public and private, suddenly noticed a slight obscurity of vision. As he was going off for his holiday in Europe he consulted an ophthalmic friend, who told him he had retinal haemorrhages and disease of his arteries. To a man who had never realized that his body was a mechanism it was a great shock to find himself "out of gear," and as he said pathetically, "it did not seem the same world when I had to give up cigars, champagne and Scotch whisky, and pleasant evenings at the club." I saw him in July, 1909, the picture of health, and with the frame of a prize-fighter, but self-centred, nervous, apprehensive, worrying all the time lest another blood vessel might break. He had had a permanent blood pressure above 220, records taken by a dozen different doctors, and he had copies of the analysis of his urine, and had provided himself with Theodore Janeway's book.

It is not always possible to suggest the factors causing the high blood pressure. It may be met with unexpectedly and determined only by the apparatus; indeed one may feel a keen sense of disappointment that the educated finger should be so far astray. It may sometimes be the initial event in an inherited bias towards cardio-vascular mischief, without the occurrence of any of the usual factors.

I saw this year, with Dr. Lichfield of Pittsburg, a healthy looking woman, aged 46, whose father, mother, several brothers, and a sister had died comparatively young of heart or arterial disease, and in whose family there was marked gout. She had herself been very healthy, except for occasional "nervous attacks." She is stated to have had congenital syphilis. She had had some pains in the muscles, rheumatic or gouty, and Dr. Lichfield was astonished to find that her blood pressure was above 200. She was a well nourished, healthy looking woman, without luetic stigmata. The peripheral arteries were nowhere sclerotic. The empty radial artery could not be felt. The temporals were not palpable. The heart impulse was not forcible, and the aortic second sound was not specially accentuated. To the touch I could not determine that the pressure was high in the peripheral arteries, but it was above 200 mm. The urine was of low specific gravity; no casts.

Where is the change in these cases? Not, so far as one can say, in the heart, not in the mains, not in the supply pipes, but to keep up a normal irrigation in the capillary beds there has to be a widespread increase of pressure in the smaller arteries. Where is the first link in the chain? In an altered condition of the vessels in the splanchnic area? In a toxaemia from the bowels? In an oversecretion of pressor substances by renals and adrenals? More likely the block is in the irrigation fields. If the director of a large irrigation plant found the pressure rising in the supply pipes of the third and fourth dimensions, and there was nothing wrong in the pump or the sluices, he would go directly to the fields to see if the channels were free, and to see that the drainage was proportionate to the supply. I believe that in these cases the primary mischief lies between the capillary cell and the lymph spaces, in the working area of the body—a row between the middle man, the manufacturers, and the sanitary authorities—a sort of general strike, to overcome which the Government has to intervene. Remember, as I mentioned, vegetable physiology teaches plainly that the *vis a fronte* is a powerful factor in the metabolism of the cell, and it may be disturbances in this sphere that necessitate, as a conservative action, an increase in the pressure with which the blood flows in the supply pipes. Or there is a difficulty in clearing of ashes and cinder the furnaces which keep up the fires of life in every unit of the bodily frame. The engines are stoked for the Glasgow express on the London and North-Western Railway, but put to work shunting empty trucks in the station yard!

Cannon and others have shown that in emotional states there is an increase in the adrenal flow, and this is a factor which has to be considered in the high pressure of modern life. Understand one thing clearly—this high pressure is not itself the disease, but a compensatory, salutary state, if not for the man, at any rate for his circulation. That this is so, try to reduce it below a certain point. You may, for a time, but up it goes again, and the man only feels comfortable when you allow him to live at a certain high level. By diet, a change in the mode of life, etc., the pressure may be kept at a reasonable rate, but in my experience, never again does it fall to the normal. The first patient illustrates how difficult or impossible it may be to permanently keep down the blood pressure. He had been at spas for special treatment; he had taken nitrites and potassium iodide; he had had "high frequency" treatment and a special course of sterilization of his colon—but all of no avail, as the pressure kept up. As he had become morbidly apprehensive and self-centred, I urged him to resume his business, lead a rational life, and stop taking "cures."

The disadvantages are: (1) Just such transient cerebral attacks as the first patient had, or headache, vertigo, flushings, or an anginal attack, or transient bouts of dyspnoea with palpitations. But more serious still is (2) the certainty that sooner or later sclerosis of the arteries will follow. And this brings me to the consideration of group II.

II. Arterio-sclerosis with High Tension and Associated Cardiac and Renal Changes.

There are two essential factors in arterio-sclerosis—the quality of the tubing and the way in which it is treated. The marvel is that any set of pipes could be constructed to stand the continuous strain to which for years the human blood vessels are subjected. To use a well-worn simile—very different qualities of rubber are used in the make up of our tubing, and longevity is very much a matter of its quality, whether good Para or not. There is, too, that curious and inexplicable element which brings such uncertainty into our calculations. Take two 1910 motor cars turned out from the same shops and by the same workmen and with the same parts. The one may give no trouble, the other may be half the time in the repair shops. Of a dozen blades of a Gillette safety razor, all identical in appearance and in fineness of edge, some may be used for weeks, even months; others may have to be cast aside in a few days. So it is with man and his blood vessels. The contract calls for from sixty to eighty years of usage. Some hold out well, and even after ninety years are still fairly good, but the personal equation has always to be considered. The ordinary wear and tear of life may bring about arterial degeneration in a temperate man of 40 years; on the other hand, who has not seen lusty octogenarians with untouched hearts and arteries?

The commoner causes of arterio-sclerosis need not detain us, toxic agents, chiefly, exogenous or endogenous, some of them acting directly on the vessels, others by disturbing the circulation in the cell factories, calling for higher pressure in the supply pipes, and so leading indirectly to sclerosis.

I should like to refer to two other causes, one of which has a note of personal appeal. There is an old motto, "It is the pace that kills," and nothing is more certain than that the pace of modern life kills many prematurely through the complications of arterio-sclerosis. The keen, sharp business or professional man, year in, year out giving his engines no rest, leading a life of high pressure, though a teetotaler and temperate in his diet, and a non-smoker, may have so driven his machine that at 50 it is only fit to be scrapped. These tragedies of life are only too common among us. It is not only a great leader like William Pepper, who died an arterial death at 55, but we see it in the men who live the hard, unselfish lives of general practice. I have notes of at least a score of physicians wrecks before 50—men, too, who had enjoyed their work, untiring, unsparing of themselves and of their time—sensible fellows in everything but in the care of their machine. Some were victims of angina pectoris, some of myocarditis, others of progressive cardiac failure, many more of the complications of arterio-sclerosis—all of the high-pressure life too often nowadays the necessary accompaniment—the penalty—of success. And I think we must recognize another factor—prolonged overuse of the muscles. That athletes die early is well recognized, but it is not easy to determine always how far the cardio-vascular changes are due to muscular effort alone. Take a not uncommon picture:

An exceedingly vigorous man, aged 50, spare, weighing only 10 st., with a good family and a good personal history. He had never had syphilis, but at 28 he had had a bad attack of typhoid fever. He had lived an out-of-door life, and had used his muscles incessantly in sports as a young man, at cricket and hunting, and when at college as a long-distance runner; no gout in his family. He had been a moderate user of alcohol and had smoked cigars and cigarettes, but not in excess. Four or five years ago he began to have headaches, which have bothered him at intervals ever since; but he has kept at work, has played tennis and golf, and it was only a few months ago that he consulted his doctor for the headaches. A very healthy-looking fellow, strong and muscular; his pulse was 80—the vessel rolled easily under the fingers. The pulse was recurrent, and there was practically no difference as one felt the vessel with the blood current in or when it was pressed out. The arteries were like whipcord. The temporals could be easily felt. The walls of the retinal arteries looked thick and they compressed the veins. The apex beat bulged the fifth interspace an inch and a half outside the nipple line—a strong, forcible, and visible beat, localized in the one interspace. The shock of both sounds was palpable, and the shock of the aortic second sound so intense that it could be heard six or seven inches away from the chest wall. The first sound at the apex was booming, a little murmurish. The urine had a specific gravity of 1020, and he did not pass an excessive amount; it showed a few hyaline casts. The blood pressure was 212.

It is true the man had had typhoid fever, and a bad attack, but the arterial changes of the acute infections rarely take the form of a widespread sclerosis. I have notes of cases of angina pectoris in comparatively young men, not syphilitic, in whom the sole factor leading to coronary artery degeneration was persistent over-exertion.

As a rule men under 60 years of age with primary arterio-sclerosis have high blood pressure, indeed the highest known records are in this condition.

In this group of cases it is well to recognize that the extra pressure is a necessity—as purely a mechanical affair as in any great irrigation system with old encrusted mains and weedy channels. Yet the victims are often robust, energetic men of great vitality. Get it out of your heads, if possible, that the high pressure is the primary feature, and particularly the feature to treat. We tied up one evening near a big pumping station on the Nile, and in conversation the Scottish engineer in charge told me that the two essential factors in maintaining uniformity in irrigation were keeping the terminal channels free between the rows of cane, and maintaining the drainage. Obstruction in the fields could be overcome by increasing the pressure, to a certain point, but it was cheaper and safer to clear out the weeds. The difficulty, I believe, is to keep the human irrigation plant free from weeds, the sud that chokes the capillary bed, through which it takes a greater force to drive the fluids. We too often tinker at the pump and the mains, instead of looking for the real seat of trouble in the fields.

It is alarming to find that a patient may only be comfortable with a pressure about 200 mm., but, as a rule, do not take too gloomy a view of the condition, which is often not so bad as it looks. For years a man may enjoy good health and do hard work with high-pressure, whipcord arteries and a hypertrophied heart. Take warning, pessimists, from this story:

I saw on June 21st, 1901, a judge, aged 46, a man of good habits, except that he had been a very heavy eater. He had been very moderate in alcohol and tobacco, and had not had syphilis. He had taken a great deal of exercise, and had always regarded himself as in the pink of condition. A year before I saw him he began to have a little shortness of breath, particularly if he played too much golf or went uphill rapidly. He consulted Dr. Delafield, who told him he had sclerosis of the arteries and enlargement of the heart, and who urged him to change his habits of life. He presented the usual picture—markedly sclerotic arteries, very high blood pressure, a strong, forcible apex beat *3 in. by measurement* outside the nipple line. The aortic second sound at the base was much accentuated. The specific gravity of the urine was high; no albumen, no tube casts. Now that did not look a very satisfactory condition in a comparatively young man who had never had syphilis nor any serious infections. He was a sensible fellow—cut down the intake of fuel, lived an easy life, attended to his duties, and has got on very comfortably. He called on me last summer; unfortunately I was away, but a message on his card read: "Am feeling very fit"!

"Judgement is difficult," says Hippocrates; but I never knew a man with so marked hypertrophy of the left ventricle to have an extension of life even beyond that granted to Hezekiah. I do not think even the most optimistic would have given him five years; Nature gave him twenty!*

High tension is not always associated with arterio-sclerosis, though present in a large majority of all patients under 60. Normal or low pressures may occur in three conditions: (1) In elderly persons with extensive sclerosis of the aorta and its chief branches; (2) with a general failure of health and strength; and (3) in the late stages with the failing, dilated heart.

What is the condition of the kidneys in these cases? This important question is not always easy to decide. In many instances the urine presents no abnormalities. There may be a trace of albumen, particularly in the morning, and a few tube casts, but the output is up to the mark, and certainly patients may for years have extreme arterio-sclerosis without serious kidney disease. And *post-mortem* studies show this to be the case. With permanent high tension alone, or with high tension *plus* arterio-sclerosis, the kidneys have been found in a few cases practically normal. We must remember that no one at 50 has kidneys completely normal histologically. In the cases of chronic arterio-sclerosis which came to necropsy from my wards in the Johns Hopkins Hospital three types of kidneys were found.

1. The full-sized, hard, beefy organ, often with a smooth surface, sometimes with slight adhesion of the capsule, but an organ obviously not contracted. When I lived in Philadelphia a remarkable man was demonstrator of morbid anatomy at the university, and coroner's physician, the late Dr. Formad. He had had a rich experience in medico-legal cases. I remember he brought before us the results of the study of the kidneys in some 250 cases of sudden death in alcoholics—176 men and 74 women—the great majority of them above the middle period of life. Accurate figures were not given of the causes of death, but the interesting feature is that nearly all of these patients had somewhat enlarged, hard kidneys, frequently, too, of the rounded, sausage-like or pig-backed form. Emerson's analysis of our cases of patients dying with features of general arterio-sclerosis showed that in 60 per cent. the combined weight of the kidneys was above 300 grams. The general experience is that in a very considerable proportion of all middle-aged persons with arterio-sclerosis the kidneys are not contracted.

2. The patchy arterio-sclerotic kidney, which presents atrophy of surface areas, or sometimes an extensive section of the end of one kidney, and everywhere showing the effects of irregular vascular sclerosis.

3. The small, red, granular kidney, the final outcome in a limited number of cases of renal arterio-sclerosis.

I need not dwell upon this side of the question further than to ask you to bear in mind that conditions of chronic hypertension and of advanced arterio-sclerosis may exist without serious interference with the renal function.

Many of these patients have been condemned as cases of incurable Bright's disease without full knowledge. Fully fifteen years ago I saw an old friend with slight swelling of the feet, cardiac weakness, retinal haemorrhages, traces of albumen in the urine, and tube casts. In a man of 60 who had worked very hard such a state certainly looked serious. He had stiff arteries and an accentuated aortic second sound. Though urged to retire, like a wise man he decided to slow the engines but to continue the voyage. I saw him a few weeks ago, now a man of 75, who meanwhile has travelled much, organized new departments of his work, and has been an active, though not a vigorous man. On and off his ankles have swollen and he has been short of breath on stairs and hills; but, like the ship in Kipling's *Devil and the Deep Sea*, with patched machinery he has been able to keep up an 8 to 10 knot rate. I was interested to examine him carefully, and found his blood pressure above 180; cardiac impulse outside the nipple line and diffuse; the pulse regular, moderately stiff vessels, a small amount of albumen with tube casts in the urine, and in one eye a fading retinal haemorrhage.

* Since giving this lecture, Dr. McCrae tells me of his death—the usual way, gradual heart failure, with the distressing mental symptoms so often seen.

III. Chronic Nephritis with Arterio-sclerosis and High Pressure.

Only a man of brazen boldness will speak dogmatically on this last, long and much-discussed group. That hyperpiesis may lead to arterio-sclerosis, that arterio-sclerosis in turn may lead to sclerosis of the kidneys, that there are primary lesions of the kidney associated with fibrosis, which lead secondarily to high blood pressure, sclerosis of the arteries, and hypertrophy of the heart—these are points upon which most of us are agreed. Here, of the two important divisions—the chronic nephritis of the infections, and the nephritis of the intoxications, gout, lead, alcohol—the end-product in both may be the small, hard, contracted kidneys. In a large proportion of all cases there are associated gradually hypertension, arterio-sclerosis, and hypertrophy of the heart. To distinguish between the two sets of cases, the primary arterio-sclerotic and the primary nephritic, is not often difficult. In the infectious group the history is generally very distinct, the patients are younger, and they rarely have the general vigour of the arterio-sclerotic form. In the lead and gout toxaemias one is rarely in doubt, though in the latter the etiology is often overlooked. On the other hand, the urinary changes in both differ from the arterio-sclerotic form in the persistent low specific gravity, the lower nitrogen output, the more constant presence of albumen (though in slight amount) and the persistence of granular casts. The symptoms, too, are renal and cerebral in the nephritic group, cardiac in the arterio-sclerotic. Uraemic features, progressive pallor, headaches, and marked ocular changes are very much more common in the primary nephritic form, and the retinal changes are degenerative, not simply haemorrhagic. There are transitional stages, and the end of the arterio-sclerotic kidney may be small, red and granular. Intercurrent acute or subacute attacks of nephritis may at any time blur the picture. I have not infrequently been mistaken, led astray usually by the robustness of the patient, and forgetting that chronic interstitial nephritis leading to extreme contraction of the organ may be consistent with good health up to the very onset of fatal uraemic convulsions. In this nephritic class we see remarkable variations in the arterial tension, persistently high in some cases, in others quite moderate, though with extreme arterio-sclerosis and hypertrophy of the left ventricle. The hypertension, doubtless compensatory, and so far as it goes salutary, is caused possibly by increased discharge of pressor substance, and in any case is imperative in the irrigation fields of kidneys choked with débris and overgrown with the weeds of connective tissue growth. The disadvantages are obvious when the chronic hypertension leads to arterial degeneration and renders the patient liable to rupture of the cerebral vessels—a common mode of death in these cases. Careful study of the blood pressure is demanded in the form in which we see hypertensive crises associated with severe headache, often the precursor of uraemia or of transient aphasia with or without paralysis, attacks which a timely bleeding, or purge, or a sweat may ward off.

Lastly, a few words on the care of these cases. Differing as they do so much in etiology and symptoms, a thorough study of each patient is required. At the same time do not lay too much stress upon the hypertension, particularly in nervous patients. When the first intimation comes in the form of an angina, or of a cerebral attack, a man naturally becomes very apprehensive. Patients easily become hipped on the subject of blood pressure; one man had his records carefully charted for eighteen months, and talked like a lay Marey on the various methods. I am not sure whether he was consoled or disappointed to be assured that it was a very good thing for him that his engines had kept up a pressure of about 180 mm.

I.

The first thing is to determine the nature of the case, whether simple hypertension, arterio-sclerosis, or chronic nephritis, or all combined. In the case of the active, driving, business man, who has unconsciously damaged the machine, let him reduce the speed from the twenty-four knots of a *Lusitania* to the ten knots of the ocean tramp. It is interesting to note that the worry and apprehension associated with the first shock of the discovery that something is wrong may cause loss of weight and with it reduction in the blood pressure. A man of 62,

whose first indication of trouble was an attack of transient aphasia, lost 2 st. in weight in a year, and his blood pressure sank from 200 to 150. He has been better since he has taken a philosophical view of the situation, and his blood pressure has risen to 180.

II.

The second thing is to lessen the intake. We all eat too much, and in no age was the saying more true that "the platter kills more than the sword." Time and again I have been impressed with this as a possible factor in obscure forms of hypertension and arterio-sclerosis in persons otherwise temperate. Largely a matter of habit, the amount of food taken should be just enough to keep the engines going at a steady speed. A diet of low protein content is best, and fairly large quantities of liquid should be taken.

III.

Thirdly, elimination should be promoted in every way, by making the action of the kidneys, bowels, and skin thoroughly efficient.

IV.

Fourthly, of drugs none are entirely satisfactory in chronic hypertension. Nitrites in various forms may be used, and are often of temporary benefit, but I think the general opinion now is that neither the nitrites nor potassium iodide are of permanent benefit; though now and again one meets with an instance in which the prolonged used of potassium iodide is followed by marked lowering of the pressure. A preparation of mistletoe has also been much lauded, but it, too, is very variable in its effects. Be careful in this point—if the patient does not feel so well, and begins to get thin and look badly, stop all drugs, trust to general measures, and let the pressure rise. In the robust man of full habit in the hypertensive crises with headaches, dyspnoea, or angina, a free venesection is indicated, to be followed by mercurial and saline purges.

The clinical picture which I have thus briefly sketched of chronic hypertension with its associations, advantages, and disadvantages, may not have all the outlines or full details which an artist with more pains and greater skill would put on his canvas, but it is a fair presentation of the subject as I have seen it, and you cannot expect more. The colours, necessarily a bit sombre, have been brightened when possible. And I believe Candide to be wrong—life at the best is not a bad bargain. Even the victim of high tension may find it useful and enjoyable if, following the rest of the moral, he will *cultivate his garden*—weeding the irrigation channels, and keeping free the drainage.

THE CALCULATION OF DRUG DOSAGE FOR CHILDREN.

WITH DESCRIPTION OF A NEW AND SIMPLE METHOD.

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The calculation of the correct dosage of drugs which are to be administered to children is of considerable importance. The systems at present in use are those of Young, Gabius, and Cowling, all of which are based on the duodecimal system, and are thus not readily applicable to the metric system; Sir Lauder Brunton's method of calculating from the metric system involves perhaps rather more mental calculation than can be expected of the practitioner when prescribing at the bedside, and further, it does not lend itself to the calculation of doses from the imperial system.

These four systems may be stated briefly: Young's formula is the age of the child divided by the age *plus* 12; according to Gabius, the correct dosage—taking 1 grain as the adult dose—is for a child 1 year old, $\frac{1}{12}$ grain; 2 years old, $\frac{1}{8}$ grain; 3 years old, $\frac{1}{6}$ grain; 4 years old, $\frac{1}{4}$ grain; 7 years old, $\frac{1}{3}$ grain; 14 years old, $\frac{1}{2}$ grain; 20 years old, $\frac{2}{3}$ grain; and above 21 years, the full dosage. Cowling's rule is the division by 24 of the child's age at his next birthday; and Sir Lauder Brunton's plan consists in using the age next birthday as the numerator and 25 as the denominator of the fraction.

Apart from idosyncrasy, abnormal development, and the excessive susceptibility to certain drugs, such as opium, a rational system for calculating dosage in children should follow the curve of increase in body weight; that is to say, we must supply the child with the same relative dose of the drug in proportion to his bulk as we supply to the adult, or, in other words, the dilution of the drug in the body tissues should be the same in both cases. It is, however, impracticable to weigh each infant before writing its prescription, and we therefore adopt the age as an indication of the development and weight of the average child and its abilities to tolerate drugs. Gabius assumes the adult age to be 21, while Cowling and Sir Lauder Brunton postpone it till 24 and 25 respectively. It may, I think, be assumed that the ages 24 and 25 were selected, not on account of any particular anatomical or physiological reason, but because of the fact that they were numbers easily divisible on the duodecimal and metric systems respectively. If statistical tables of the average weights of males and females be examined it will be noticed that the body weight becomes stationary on an average at from 20 to 22 in males and from 19 to 20 in females. Thus, we find that the average adult age according to the weight is from 20 to 21 years. These figures I have arrived at by averaging the results of statistics by Quételet, Landois, Beneke, and Roberts, the last-named having obtained his data from English-speaking children, who are relatively much heavier than Continental children. Whichever series of weight statistics is adopted, it makes little difference to the final results, since we are concerned with the relation of the child's weight at a certain age to his probable adult weight. The following table—taken, since we are dealing with English children, from Roberts's tables—will illustrate the points to which references have been made:

Average Kilogram Weights of Children at Different Ages and their Proportion to the Average Adult Weight.
(Compiled from Roberts's Tables.)

Age.	Average Kilogram Weights.		Proportions to the Average Adult Weight.		
			Male.		Female.
	Male.	Female.	Adult Age as 21 $\frac{3.22\times100}{65.7}$	Adult Age as 24 $\frac{3.22\times100}{67}$	Adult Age—21 or 24 $\frac{3.13\times100}{55}$
Birth	3.22	3.13	4.90	4.80	5.69
1	10.89	9.12	16.59	16.25	16.58
2	14.75	11.48	22.45	22.01	20.87
3	15.42	14.35	23.47	23.01	26.09
4	16.92	16.39	25.90	25.25	29.80
5	18.14	17.78	27.59	27.07	32.32
6	20.15	19.05	30.66	30.07	34.64
7	22.68	21.55	34.52	33.85	39.18
8	24.95	23.54	37.95	37.24	42.80
9	27.40	25.17	41.70	40.89	45.76
10	30.62	28.12	46.60	45.70	51.13
11	32.66	30.90	49.70	48.74	56.18
12	34.93	34.66	53.16	52.13	63.02
13	37.66	39.55	58.84	56.21	71.99
14	41.73	44.00	63.51	62.28	80.00
15	46.68	48.18	70.83	69.67	87.60
16	53.94	51.31	82.09	80.50	93.29
17	59.38	52.35	90.38	88.62	95.18
18	62.28	54.89	94.79	92.95	99.80
19	63.46	56.21	96.59	94.71	102.20
20	64.96	55.93	98.87	96.95	101.69
21	65.73	55.20	100.00	98.10	100.36
22	67.09	55.93		100.00	101.69
23	67.09	56.25		100.00	102.27
24	67.09	54.85		100.00	99.73

The first two columns of the table show the average kilogram weights of males and females from birth to the age of 24. The third column indicates the percentage of the adult weight which the male child possesses at different ages, taking 21 as the adult age. Column 4 shows the percentage weight of male children taking 24 as the adult age, and it will be observed that the variation of the figures is within narrow limits. The last column gives the female child's percentage weight for both 21 and 24 as adult age, since the weight at both ages is practically identical. The third, fourth, and fifth columns give, therefore, the absolute average percentages of the adult dose which we should employ at different ages. These may be plotted in a curve as in Chart 1.

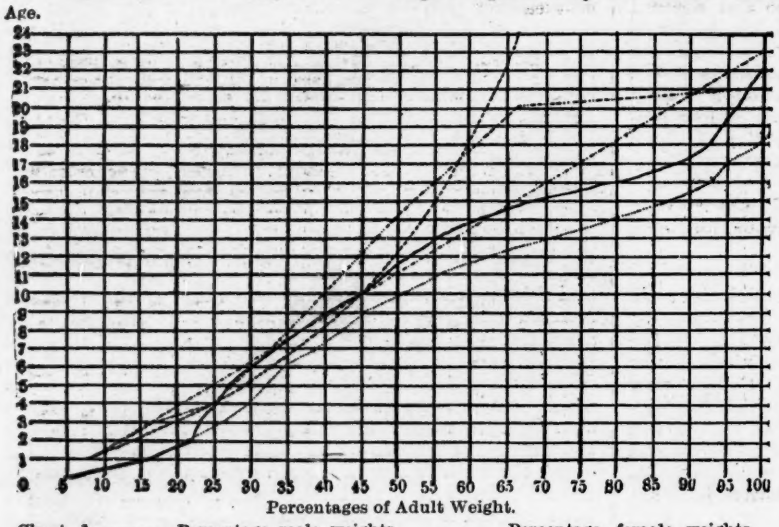

Chart 1.——— Percentage male weights. ..... Percentage female weights. ------ Young's formula. --.--.. Gabius's formula. -.-.-. Cowling's formula.

In Chart 1, columns 5 and 6 are plotted to show the average percentage increase in the weight of individuals, using 24 as the adult age, and it is evident from the curve that females reach their maximal weight earlier than is the case in males; this is a fortunate circumstance, since it is recognized that females as a general rule require rather smaller doses than males, and, as will be seen, a medium course may be attained. These curves, then, not only exhibit the percentage increase in body weight, but also supply the absolute average dosage at ages below 24 for males and females; thus, for example, for males of 12 years the exact dose, reckoned according to body weight, should be 53 per cent. of the adult dose; at 15 years, 71 per cent., and so on.

For comparison, I have also plotted in this figure the formulas of Young, Gabius, and Cowling, calculated as percentages to show their relationship to the curve of weights. Young's formula, which is probably that most frequently employed at the present time, is decidedly the least satisfactory; the fraction $\frac{\text{Age}}{\text{Age} \times 12}$ is sufficiently accurate up to the 11th year, after which it diverges from the weights curve since the fraction can never become a unity. Gabius's formula diverges in much the same manner, but Cowling's rule follows the curve fairly closely till the 15th year, after which its dosage is also on the small side.

Chart 2 gives the curves of average percentage weights, using the weight at 21 years as 100. The general type of the curves is that of Chart 1. On Chart 2 is plotted Lauder Brunton's method of calculating dosage with the metric system; this falls from start to finish below the actual dosage calculated from the weight, and the same statement holds good if age 24 be taken as the standard, as may be noted if Brunton's curve be plotted on Chart 1.

What is desirable is a simple rule for the calculation of dosage which shall follow as nearly as possible the curves of percentage body weights. This, I believe, may be most easily attained by using 100 as the denominator and 20 as the adult age—thus, the formula $\frac{\text{Age} \times 5}{100}$ gives a curve which, as shown in Chart 2, lies for the greater part of its course between the percentage weights of males and females. Such a fraction is extremely easy to calculate when metric weights are in use. Thus, to take Sir Lauder Brunton's example—if 0.33 gram be the adult dose, the dose for a child of 7 is 0.1155 gram, obtained by multiplying 0.33 by 35, and shifting the decimal points two places to the left. On Lauder Brunton's system the dose is $\frac{0.33 \times 8}{25}$ or $\frac{0.33 \times 32}{100}$ = 0.1056 gram; and the absolute dose is 0.1138 gram and 0.1293 gram for males and females respectively. This instance is of more than ordinary difficulty for the new system, for, if the child's age were an even number, calculation would of course be simplicity itself. For instance, to use the same dose for a child of 8 years, we obtain 40 as multiplier and the figure 0.133 gram at once; the absolute being for this age in males 0.125 gram and in females 0.141 gram. While 100 as a divisor is especially suitable for the calculation of metric doses, it is not essential for doses stated in terms of the imperial units. Here multiplication of the age by 5 is cumbersome, and the formula $\frac{\text{Age}}{20}$ gives the same ratio, and affords simplified fractions, easier for calculation than those of any of the other systems employed for the imperial units.

Criticism of the Method.

In order to test the accuracy of the above method for calculating dosage, I have plotted curves showing the average percentage weights from both Continental and English statistical tables, and also curves showing the values after deducting the weight of the clothes. In all cases, however, I have found that the formula $\frac{\text{Age}}{20}$ or $\frac{\text{Age} \times 5}{100}$ gives the nearest approximation to the actual dosage. Below the age of 6 the formula gives too small a dosage for both males and females, but this is the case with all systems and is, perhaps, no disadvantage, since it is in those early years that especial care must be exercised in the administration of drugs, and particularly of those which influence the nervous system, which is then

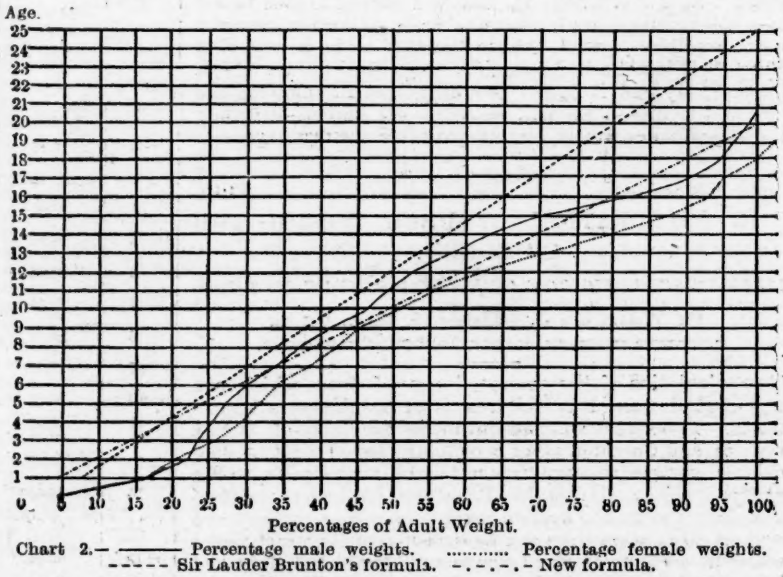

Chart 2.——— Percentage male weights. ..... Percentage female weights. ------ Sir Lauder Brunton's formula. -.-.-.- New formula.

in a stage of rapid development. After the age of 6 the author's method lies almost regularly between the curves of male and female weights. For males, therefore, it gives a slightly higher dose than is necessary; for females a lower dose than is required. This latter feature is of importance, since, as already stated, females are, as a rule, more sensitive to drugs than males, especially at the age of puberty, at which time this formula gives a dosage decidedly lower than that demanded by the weight of the average female.

CONCLUSIONS.

1. Of existing formulae for the calculation of doses in children from imperial measures, those of Young and Gabius are of little value after the 10th year. Cowling's formula is the best of the older methods.

2. Sir Lauder Brunton's formula, for calculating dosage with metric weights, gives figures which are somewhat low at all ages and for both sexes; the calculation is also a little elaborate, and is not readily applicable to the imperial system.

3. The method suggested by the writer for the metric system $\frac{\text{Age} \times 5}{100}$, or for the imperial system $\frac{\text{Age}}{20}$, results in doses which correspond closely with those demanded by the average weights of non-adult individuals of both sexes at different ages; the calculation is simple, and the method can be employed for the metric and also for the imperial weight systems.

SUCCESSFUL REMOVAL OF A TUMOUR IN THE ADRENAL GLAND.

BY

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IN the BRITISH MEDICAL JOURNAL, October 12th, 1907, I recorded a case of retroperitoneal haematocele causing acute intestinal obstruction. The sequel to that case is recorded now.

History.

In July, 1907, I was asked by Dr. F. Pershouse, of Johannesburg, to see in consultation with him a lady, aged 39, who the previous day had shown typical symptoms of acute intestinal obstruction. The history was that three years previously, shortly after confinement, she discovered a lump in the left lumbar region, which caused a certain amount of dull, aching pain in the back. She suffered always from constipation, but could obtain relief by means of cascara. A year ago, while in London, she had symptoms of obstruction, but apparently not of acute character. Under the advice of a surgeon whom she consulted, massage was carried out, with complete relief to the symptoms. From time to time, however, she had left lumbar pain, and always more or less constipation.

Condition before Operation.

The patient had been confined twelve days before I saw her, having a perfectly normal labour. The facial aspect was anxious, vomiting was frequent, the vomited material being greenish-brown and inoffensive. The pulse was 100 and rising steadily. The abdomen was distended, though not greatly so, and in the left lumbar region a hard movable lump could be felt. On bimanual examination it was found to extend into the loin, and was movable antero-posteriorly but not laterally. It was dull on percussion. The impression conveyed was that of a para-renal growth of some kind. There had never at any time been any renal symptoms. The lump extended from the left renal region down to the umbilicus and over to the middle line. The nature of the swelling was quite uncertain, and beyond a vague suggestion that it was a para-renal "something," no diagnosis was made.

First Operation.

The condition of the patient was critical, since no relief had been obtainable by enemata, and the acuteness of the symptoms was hourly increasing. She was therefore removed to a nursing home, with a view to operation. Four hours later, Dr Pershouse anaesthetizing and Dr. Stanley Heberden assisting, I opened the abdomen in the left linea semilunaris, over the swelling. There was no sign of peritonitis. The descending colon was completely flattened over a large tense swelling, which bulged forward the posterior peritoneum, the colon lying to its outer side. Some large vessels, apparently supplying the colon, ran over its surface. Above, the swelling was apparently continuous with the left kidney, and it extended well over to the middle line. An incision was made parallel with the vessels through the posterior peritoneum, and an attempt made to shell out the swelling. It was, however, completely fixed posteriorly and above, and a fresh layer was attempted in what looked and felt like a tumour capsule. Suddenly the finger slipped into a large cavity, from which rushed some fluid blood and large masses of blood clot, some recent and some old. The peritoneal cavity had been well packed off, and there was no soiling of the peritoneum. The cyst cavity having been thoroughly emptied and sponged out, the cyst wall was stitched all round to the peritoneum of the anterior abdominal wall and the cavity stuffed with gauze. There had been free oozing from the wall of the cyst, but this ceased on pressure with the gauze packing. None of the cyst wall was removed, since there was none to spare when the cut edges were brought forward.

The subsequent progress of the case was uneventful, the patient leaving the home in a month.

Contents of Cyst.

The material removed from the cyst was submitted to Dr. Pakes, pathologist to Johannesburg Hospital, and his report was that it was old and recent blood clot, with fluid blood.

It seems clear that the origin of the trouble was a retroperitoneal haemorrhage during confinement three years ago—that at the recent labour a fresh haemorrhage occurred, rendering the cyst tense and flattening the colon over it. It is difficult to determine precisely the source of the haemorrhage whether from a mesenteric vessel, a renal branch, or a pancreatic vessel, it is impossible to decide.

Could the nature of the swelling in this case have been diagnosed, there is no doubt that drainage through the loin by an extraperitoneal operation would have been the ideal one. Fortunately, however, all went well by the method adopted.

If this earlier history of the case in 1907 can be considered of real interest, the subsequent events in regard to the same patient are still more worthy of record.

In March, 1912, I was again asked by Dr. Pershouse to see this patient, as she was once more threatened with intestinal obstruction. Since the operation in 1907 she had been remarkably well, only suffering from time to time from constipation and occasional left lumbar pain of quite moderate character. When seen the patient's general condition was good. For about twelve hours there had been some vomiting; she was decidedly thin, but presented no other abnormality in general appearance. There was no discoloration of the skin anywhere.

In the left loin was a densely hard tumour, movable antero-posteriorly, but not vertically, having the colon in front of it. It filled the loin space and extended to the middle line. There were no renal symptoms. A paper by Mr. Alban Doran[1] on cystic tumour of the suprarenal body successfully removed by operation was materially helpful to me in making a diagnosis of suprarenal tumour.

Second Operation.

The patient was removed to Johannesburg Hospital for operation. Dr. F. B. Mudd anaesthetizing and Dr. George Murray assisting, I made the usual oblique incision in the left loin employed for nephrectomy. On opening the loin space I came upon a large dense tumour, having a tough fibrous capsule which extended from the diaphragm downwards to below the iliac crest and over to the middle line. Below it was the left kidney pushed into the iliac fossa, with its upper pole flattened from pressure. The tumour was adherent to the kidney below, the descending colon and peritoneum in front, and the diaphragm above. Its separation from the kidney was clean and easy, from the diaphragm and colon more difficult, and the peritoneum was torn twice and sutured in the usual way. There was no definite pedicle, but vessels were ligatured with catgut as they were encountered. There was no difficulty in controlling haemorrhage, although some of the vessels were of considerable size. The kidney was pulled up into the loin and retained in place by sutures through its perirenal fascia, and a drainage tube inserted down to it. The patient left hospital well on the twenty-eighth day.

The tumour, which was about twice the size of a fetal head, was globular, with one small nodular outgrowth. It had a dense, laminated fibrous capsule, presenting on the inner surface thickenings here and there, which on section showed adrenal tissue. The interior of this fibrous capsule was filled with dense altered blood clot of old standing.

I am indebted to Dr. Watkins-Pitchford, Government Bacteriologist and Pathologist, Johannesburg, for microscopic sections and preservation of the tumour. Dr. Watkins-Pitchford was of opinion that the growth was a hypernephroma. The tumour and sections are now in the Royal College of Surgeons, England.

There can be no doubt that the lumbar route is the method of choice for the removal of growths of this character; it is easier, quicker, and therefore safer than by anterior abdominal section. This is, so far as I can discover, the first case of the kind removed through the

loin, and if I am not mistaken the first one diagnosed as suprarenal growth prior to operation. I refer, of course, to growths in the adrenal itself, not to growths of adrenal origin embedded in the kidney.

REFERENCE.
[1] BRITISH MEDICAL JOURNAL, June 27th, 1908.

SOME EXPERIMENTS WITH IONIC MEDICATION.

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(Performed under a grant from the Royal Society at the Laboratories of Pathological Chemistry, University College, London.)

THE subject of ionic medication is so technical as to involve in considerable difficulties those not continually applying it. One source of error that the beginner is very apt to fall into is that of not recollecting which pole should be used to drive in each particular ion: for instance, I recently came across a case in which a surgeon ordered the ionization of cocaine and employed a nurse to do this for him: both he and the nurse agreed that the cocaine should be placed on the negative pole. Now, as basic radicles, including alkaloids, are driven in at the positive pole and acid radicles at the negative pole, the result of this, of course, was that, cocaine hydrochloride being the salt used, no cocaine was driven in at all, but only chlorine ions. Another error is exemplified by a simple experiment which the author has performed upon himself, which can easily be repeated and which will also serve to emphasize some of the essential points of the treatment. A pad of cotton-wool soaked in cocaine hydrochloride was placed on the forearm over a square window cut in a piece of oil silk; this was connected with the positive pole: a similar pad was placed on the other forearm with an oil-silk window of exactly the same size and connected with the negative pole: the size of the window in the oil silk was 3 × 3 cm., and the current used was from 10 to 15 milliampères for ten minutes, the time being reckoned after the needle had first reached 10 milliampères. It was found at the end of this time that the skin in the square area covered by the *positive* pad was completely anaesthetized, while no anaesthesia whatever was obtained beneath the *negative* pad, showing that the cocaine had been introduced from the anode (or positive pole), not from the kathode (or negative pole). Now, anybody who repeats this experiment will find that the anaesthetic effect of cocaine ions so administered is extremely transitory, passes off in a few minutes, and is followed by hyperaesthesia and hyperaemia, which persist for some days and which are succeeded by brown pigmentation. Obviously, therefore, this method is a bad one for local anaesthesia.

A further experiment was performed with cocaine; this drug was first driven in (from the anode, of course) over an area of 2 × 1 cm. An attempt was then made to extract the cocaine from half this area by covering half the patch and reversing the current, but this was not successful, the reason being either that cocaine is deposited in the tissues in an insoluble form, or else that the ions of sodium, potassium, etc., which abound in the tissues, are extracted in preference to the heavier cocaine ions.

In order to determine as far as possible the path which various ions took when they were introduced into the tissues, a series of experiments was performed on animals.

The method used was as follows: The part to be treated (generally the animal's back) was first of all shaved. After a few days had elapsed to allow any abrasions due to the action of parasites or to minute lesions incidental to shaving to heal thoroughly, the animal was anaesthetized by chloroform or ether. A thick pad of pure cotton-wool was thoroughly wetted with a solution of the salt containing the ion to be tested and a piece of metal gauze connected to the source of current placed over it. The whole was then completely enveloped in a piece of oil-silk in which a window 2 × 1 cm. had been cut on the side opposite to the gauze, and this window placed against the skin: a similar pad was prepared and connected with the other pole. By this method there was no possibility of short-circuiting even if the pads touched. In order to obtain uniformity one-twentieth normal solutions were used in all cases, so that they all had the same number of molecules per unit volume, that number being sufficient to provide an adequate supply of ions. For convenience the pad on the right side of the back was always connected with the anode.

The current was obtained from a shunt rheostat across a constant current main. The resistance handle was moved rapidly until the ammeter registered 6 milliampères*; the resistance had to be varied to keep the current constant during the experiment. The current was allowed to flow for a definite time, and in the case of some of the ions the effect of passing the current for different lengths of time was observed. The skin containing the ionized patches was then removed and in most cases the subcutaneous tissue and muscle beneath it also, the animal being killed by an overdose of the anaesthetic. An attempt, where possible, was then made to stain the ions *in situ* by immersing the tissue in a solution which caused the formation of a coloured compound with the ions in the skin. When this method could not be used the tissue was merely fixed and hardened in alcohol and stained in various ways. In all cases the tissue was properly hardened and embedded in paraffin and microscopical sections were made. In one experiment in which it was desired to observe the late effect of the action of zinc ions the animal was allowed to recover and was killed at a later date.

The experiments were performed on cats, rabbits, a monkey, and a dog.

The ions experimented with were:

Acid Radicles (from Kathode).	*Basic Radicles (from Anode).*
Hydrogen	Hydroxyl
Sulphide	Calcium
Ferrocyanide	Zinc
Ferricyanide	Copper
	Ferrous
	Ferric
	Mercuric

It would be as well in the first place to describe a very important experiment bearing on the whole question of the ionic treatment of joint diseases. A monkey was anaesthetized by chloroform, and a pad soaked in potassium ferricyanide was placed over the front of its knee, the area which the solution touched being limited by a window cut in a piece of oil-silk. This pad was connected with the negative pole, that attached to the positive pole being placed on the back. A current of 10 milliampères was passed for thirty minutes, and then the animal was killed. Before its death, however, the knee was removed by cutting through the thigh and the leg, and was placed in a solution of ferrous sulphate. A control experiment was performed in which a pad of potassium ferricyanide was fixed on a monkey's knee for the same length of time, no current being passed, and the knee was subsequently treated in exactly the same way. The next day the knee was opened, and it was found in the case in which the current was used that the skin, subcutaneous tissues, and patellar tendon over which the window had been placed were stained an intense blue from the interaction of the ferricyanide ions and the ferrous sulphate, and further that this blue extended right into the joint, there being a stained patch on the cartilage which penetrated right down to the bone. In the control the blue did not even penetrate the skin. This definitely proves that it is possible to introduce the ions of some substances directly into a joint, even into the cartilages; at any rate of a comparatively superficial joint like the knee.

Very few ions driven in at the kathode, that is to say, acid radicles, can be traced in this way, but it is possible in various ways to trace certain of the basic radicles driven in at the anode.

The penetration of different ions varies enormously, and it is possible to tell from the movements of the needle of the milliammeter whether a drug is entering the tissues freely or not. In using two ions which penetrated the tissues freely, it was found that if the handle of the shunt resistance was moved to a certain point and left there the milliampèrage gradually increased, which means that the resistance of the skin had diminished so that the ions were entering in greater number. With ions which

*In most of the experiments this was found the most convenient current to use.

precipitated in the epidermis, as described subsequently, the milliampèrage actually decreased after the first few moments, showing increased skin resistance and a lessened number of ions entering; to maintain the milliampèrage at all, the handle of the shunt resistance had to be continually moved in order to raise the voltage. In the case of ions subsequently proved to be deposited in the deeper layers of the skin, an intermediate effect was obtained, the current rising first and falling afterwards.

Hydrogen and hydroxyl ions cannot themselves be stained, but it was found that hydrogen ions caused the tissues to have an increased affinity for basic stains, the whole of the tissues under the ionized patch being deeply coloured by them, and the nuclei not picked out in the usual way. On the other hand, hydroxyl ions (introduced at the positive pole) produce the reverse effect, the tissue under the ionized patch failing to take basic stains. The staining in the hydrogen ion patches was even, and no granules could be detected. The effects persisted some time, as in one case the animal was allowed to recover, and the patches excised two days afterwards, when they still exhibited the same phenomena.

Attempts to stain sulphide ions by immersing the tissue in metallic salts, such as mercuric chloride, failed. Similarly, metallic ions could not be stained by immersing the tissue in solutions of sulphuretted hydrogen or potassium sulphide.

Ferrocyanide ions can be traced through the skin and subcutaneous tissue into the muscles; they are seen in large quantity in the capillaries of the subcutaneous tissue. All the tissues are stained blue, but the stain is not quite diffuse, as some parts seem to be picked out and stained more than the rest; the hair follicles and sebaceous glands are to a large extent avoided, and apparently the absence of staining of these is because the fat which they contain is a non-conductor of electricity. The taking up of the ions by the subcutaneous capillaries gives the deep layers of the subcutaneous tissue a more intense colour than the superficial layers. Ferricyanide ions give a very similar appearance to that obtained with ferrocyanide ions.

Copper ions were easily demonstrated by fixing the tissue with potassium ferrocyanide. They were deposited entirely in the epidermis, not even reaching the corium, and the deposit extended a short way down the hair follicles.

With ferric ions, the tissues being fixed in a solution of potassium ferrocyanide, precisely similar results were obtained. With ferrous ions, on the other hand, the appearances were almost identical with those given by ferrocyanide ions, with the exception that there was a rather more abundant deposit in the epidermis.

Calcium ions were found to be deposited in and beneath the corium, only a small quantity going through the corium, even when a large current was passed for a long time. The deposit takes the form of minute granules which stain very intensely with a basic dye.

Unfortunately the attempts to demonstrate zinc ions failed; one would expect from the macroscopic results to obtain very similar preparations to those of calcium ions, as in each case the skin presents an opaque white appearance after the ionization.

Attempts to stain mercuric ions also failed, but from the behaviour of the current they apparently penetrated the tissue readily.

These experiments are admittedly very incomplete, although they serve to demonstrate some important facts with regard to the science and practice of ionization.

I cannot conclude without tendering my best thanks to Dr. Goodbody for kind advice and assistance during these experiments, and to Dr. Bellamy for cutting the numerous sections in the last experiment.

A COMMISSION, appointed to advise the authorities in regard to the new German Criminal Code, has recommended that duelling with rapiers, provided that certain conditions are fulfilled for the protection of life, should not be made a punishable offence. The *Muench. med. Woch.*, in noticing this recommendation, remarks that duelling among students will in future lack the stimulation of being forbidden. Our contemporary therefore anticipates that this antiquated method of exercising muscles, pluck, and skill will become still less fashionable than it has been within recent years.

A CASE OF URAEMIA TREATED BY MORPHINE.

BY

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SUGGESTIONS in the textbooks in regard to the use of morphine in acute uraemia are usually so unconvincing that I thought my experience in a recent case might prove useful.

On July 23rd of this year I was called to see W. L., a warehouseman, aged 56. He was sitting by the fire, wrapped in blankets; his face was puffy and dusky in colour, and his legs very oedematous; his whole body was also oedematous, though not extremely so. There did not appear to be any effusions into the serous cavities.

He had been feeling vaguely out of sorts for some weeks and, latterly, particularly short of breath and easily tired. A week before I saw him he had consulted his club doctor, who had prescribed for him. He had seen him again three days before my visit. He gave a history of a severe attack of scarlet fever seventeen years previously; eleven years ago he was told he had Bright's disease, but the doctor whom he then consulted told him he was cured of it.

The patient was too ill to examine very thoroughly at my first visit: the pulse was about 90, and very full; the cardiac impulse was about 1 in. outside the nipple line, with a blowing systolic murmur; the second aortic sound was accentuated, I had not my sphygmomanometer with me, so I do not know what his tension was, nor did I, unfortunately, take it with me before his acute symptoms started. He was complaining of constant eructation of wind and occasional vomiting; he had headache, but no ocular symptoms. The urine was almost solid with albumen on boiling.

The patient was put to bed, and diaphoretics, aperients and warm packs ordered. Next morning he expressed himself much better. The sickness and eructation of wind and vomiting had stopped, and the oedema had already to some extent receded. In the evening his son came to tell me that the vomiting had recommenced, and that he was not so well. Shortly after midnight I was sent for, and on going to see him I found that he had got out of bed and fallen on the floor; he was somewhat incoherent and could not raise himself; being a big, heavy, man, it was not an easy matter to lift him back into bed. I was inclined to think that he had probably had a fit and fallen out of bed. His pulse was still very full, though not rapid, and as I thought that convulsions seemed imminent, I tried venesection and inhalation of amyl nitrite. The venesection was not a success, only about 5 oz. of blood being abstracted. He became quiet and seemed inclined to sleep, so I left him, but ordered him another hot pack.

At 8.30 the same morning I was again sent for; I was told that he had had five fits since 7 p.m., and could not be kept in bed. I found him unconscious and extremely restless, cyanosed, and incessantly throwing himself about from side to side of the bed. Having had so unsatisfactory an experience of venesection, I did not attempt it again, but gave him a hypodermic of morphine sulphate ¼ grain with atropine sulphate $\frac{1}{150}$ grain, and told his friends to get a cylinder of oxygen and administer it continuously. I called to see him again about an hour after the injection, and he was sleeping fairly quietly and had not had another fit.

At 2 p.m. I called again; he had just had another very severe fit—the first since the hypodermic injection. He was unconscious, deeply cyanosed, with a slow, full pulse, and heaving himself up and down and from side to side of the bed as if in a struggle for breath. He did not keep in one position for more than two or three seconds, and the oxygen could not be administered because of his extreme restlessness. The dyspnoea was extreme and the veins extremely engorged. I now immediately venesected him, and with the utmost ease withdrew at least 25 oz. of blood. This improved his colour considerably and to a certain extent his restlessness. He was still restless, however, and I was so anxious about the condition of his heart that I thought quiet must be obtained at almost any cost, so I gave him another hypodermic of morphine sulphate gr. ¼,

atropine sulphate gr. $\frac{1}{150}$. He became quiet in about a quarter of an hour and slept peacefully and continuously until 7 p.m. He then awoke conscious and comparatively himself. He had a good night and awoke next morning feeling "very comfortable."

He has since then had no more bad symptoms, and although he has still a fair quantity of albumen in his urine he is in other respects very well. Oedema, flatulence, and vomiting all quickly disappeared, the cardiac impulse came in to well inside his nipple line, and he now expresses himself as feeling better than for many months. He remembered faintly my finding him on the floor of his bedroom at 1 a.m., and then remembered nothing else until he awoke at 7 p.m. on the same day, and wondered why his elbows were bandaged. His case was, I imagine, an acute attack on the top of a chronic parenchymatous nephritis.

Although the venesection undoubtedly did him good, and possibly, too, the inhalation of oxygen, which was given continuously for about ten hours except when his restlessness was too great to admit of it, I have no doubt in my mind that it was the morphine which saved his life.

TWO CASES OF PEPTIC ULCER OF THE OESOPHAGUS.

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My attention has been called recently to the account of an interesting case of perforative peptic ulcer of the oesophagus, published by Dr. James Miller in the BRITISH MEDICAL JOURNAL of January 20th, 1912. The two following cases came under my notice at St. Bartholomew's Hospital, and should be recorded on account of the rarity of the condition. The ulcer in the first case perforated into the left pleura; in the second case no perforation occurred. In the first case a diagnosis of perforated gastric ulcer was made, and in the second a diagnosis of gastric ulcer. In both cases acute abdominal symptoms occurred; laparotomy was performed, and nothing abnormal discovered. Both cases ended fatally, and occurred in males over 40.

CASE I.—*Acute Perforation of an Oesophageal Ulcer into the Left Pleural Cavity.*

A. S., male, aged 47, was admitted to St. Bartholomew's Hospital under my care at 11.45 p.m., May 22nd, 1910.

History.—Sudden epigastric pain at 7.30 p.m. (whilst lying down). Last meal 3.30 p.m. (mutton and potatoes). No history of jaundice, indigestion, or urinary troubles.

Condition on Admission.—Face pale and pinched. Temperature 95°; pulse 100, regular, weak; respirations 36; abdomen distended, not moving on respiration. No localized swelling. On palpation, abdomen very hard and very tender in the right hypochondrium. Liver dullness two inches below costal margin. Nothing abnormal discovered in heart and lungs.

Exploratory Laparotomy, May 23rd, 12.15 a.m.—No free gas or fluid. Intestines red and injected. Several small omental haemorrhages. Stomach, duodenum, liver, gall bladder, bile ducts, pancreas, spleen, appendix and kidneys examined and found natural. Wound closed. The stomach was washed out on the table, but only a small portion of the fluid was returned on siphonage. No vomiting occurred after this. The patient became very restless, respirations increased in rapidity, and he died at 8.10 a.m.

Autopsy.—The right pleura contained about a pint of blood-stained fluid. The right lung was collapsed, but was not otherwise abnormal. The left pleura contained four pints of thick turbid brown fluid with an odour of gastric contents. The fluid contained recognisable pieces of meat and vegetable. The left lung was collapsed. In the lower lobe near the middle line there was a small gangrenous cavity which communicated by an aperture about ¾ in. in diameter with the left pleural cavity, and by a similar sized opening with the oesophagus immediately above the cardiac orifice of the stomach. The opening in the oesophagus had a discoloured shelving edge, and was not clean cut. It showed no evidence of any pre-existing chronic ulcer or of new growth. No foreign body could be found in the neighbourhood of the perforation. The rest of the oesophagus was natural. The stomach was natural, and contained a considerable quantity of solid food. Liver fatty. Remaining organs natural. No peritonitis.

CASE II.—*Oesophageal Ulcer without Perforation.*

A man, aged 52, was admitted to St. Bartholomew's Hospital under the care of Dr. Herringham on May 8th, 1909.

History.—Quite well until five months ago, when he began to suffer from sickness after food without pain. Vomiting continued almost daily until admission, and the vomit was occasionally "coffee ground." For the last two months epigastric pain had been constant.

Condition on Admission.—Large, well built, stout, anaemic man. Temperature 99°; pulse 98; respirations 20. Brassy cough. Arteries not thick. Tongue furred. Chest: *Nil* abnormal. Abdomen: Tenderness to the left of the ensiform cartilage. Urine: Natural. Blood: Red corpuscles, 3,104,000; haemoglobin, 24 per cent.; colour index, 0.4; white corpuscles, 10,000. A skiagram of the chest showed a normal area of cardiac dullness and a normal aortic shadow.

May 8-27. Vomit contained altered blood and no free HCl. Temperature was irregular.

May 15. Pain constant. Vomiting frequent.

May 22. No food given by mouth. Rectal salines.

May 26. Eggs and milk by the mouth.

June 2. No pain or tenderness.

June 4. Vomited altered blood.

June 6. Pain returned. Frequent vomiting.

June 15. Transferred to surgical ward (under the care of Mr. Lockwood).

June 20. Operation. Incision in middle line above the umbilicus. Nothing abnormal found. Wound closed. Temperature and pulse rose after operation and patient died on June 22nd.

Autopsy.—No peritonitis. All organs very pale. Stomach natural. Duodenum contained a pouch the size of half a chestnut. Oesophagus: There was a chronic punched out ulcer the size of half a crown involving the lower end of the oesophagus close up to the cardiac orifice. There was no perforation into the pleural cavity, but the base of the ulcer was extremely thin. Microscopically the ulcer showed chronic inflammation and no evidence of malignant disease.

EIGHTIETH ANNUAL MEETING

OF THE

British Medical Association.

Held in Liverpool on July 19th, 20th, 22nd, 23rd, 24th, 25th, and 26th.

PROCEEDINGS OF SECTIONS.

SECTION OF TROPICAL MEDICINE.

Professor J. L. TODD, McGill University, Montreal, President.

PRESIDENT'S INTRODUCTORY REMARKS.

THE PRESIDENT limited his introductory remarks to expressing a few words of welcome to those present, and then called upon Drs. J. W. W. Stephens and H. B. Fantham to read the first paper.

PAPERS DEALING WITH TRYPANOSOMIASIS.

I.—J. W. W. STEPHENS, M.D.Cantab., and H. B. FANTHAM, D.Sc.Lond., B.A.Cantab.

TRYPANOSOMA RHODESIENSE (STEPHENS AND FANTHAM).

A SECOND SPECIES OF AFRICAN TRYPANOSOME PRODUCING SLEEPING SICKNESS IN MAN.

Prefatory Note.

EARLY in 1910 a case of sleeping sickness in a European from Northern Rhodesia was being treated in the Royal Southern Hospital, Liverpool. The case was studied from various points of view by Sir Ronald Ross and Dr. D. Thomson.

In March of the same year I was demonstrating the trypanosomes in the blood of a rat sent as *T. gambiense* to a class of students, when I noticed certain peculiarities in the structure of the trypanosomes. These peculiarities were so striking that I remember well telling my students to label their slides *T. gambiense* (?) as I felt certain that some mistake had been made. On inquiry I found that the rat had been inoculated with the blood of the patient in hospital, though at the time I was ignorant of this. I now proceeded to see if the forms I had observed were to be found in the ordinary laboratory strain of *T. gambiense*, but after examining the latter over and over again I was unable to find them. In a letter dated

May 9th, 1910, to the Advisory Committee for the Tropical Diseases Research Fund I noted these points. In the meantime I was continuing my observations on this trypanosome, and eventually I mentioned my suspicions that I was dealing with a trypanosome that was not *T. gambiense* to my colleague Dr. Fantham, who kindly consented to help me in describing it, and before doing so to make quite certain again that *T. gambiense* did not show these forms. (J. W. W. S.)

We finally felt that our position was secure, and we read a paper on the subject before the Royal Society on November 3rd, 1910, the concluding paragraph of which is as follows:

> Our own view is that we are dealing with a new species of human trypanosome for which we propose the name *Trypanosoma rhodesiense.*

We mention these points somewhat in detail because they appear not to be generally known, but all the dates can be verified by reference to the literature.

Before summarizing the evidence in favour of the specificity of *T. rhodesiense*, we would emphasize the fact that the identification of a trypanosome is a very difficult matter, and that with our increase in knowledge the difficulty has hardly decreased; in fact, it may be stated to have increased. We must, indeed, make use of every possible means at our disposal, even though these may not be perfect. What, then, is the evidence on which we base our belief that *T. rhodiensse* is a second species of African trypanosome producing sleeping sickness in man?

1. *The Morphology.*

The peculiarity of this trypanosome is that in the blood of *all* subinoculated animals the nucleus instead of being in the middle or near the middle of the trypanosome, as is usually the case, is, in some of the short or stumpy forms of the trypanosome near the posterior end, more or less close to the blepharoplast (kinetic nucleus), or even on its posterior side. We believed, and still believe, that this morphological feature alone definitely enables us to distinguish the trypanosome from *T. gambiense.*

2. *Animal Reactions.*

Laveran sums up the question of the animal reactions as follows:

> The total results correspond with those of other authors—namely, Bevan, Yorke, Fantham, Laveran, Mesnil and Ringenbach, and others, and show that *T. rhodesiense* is clearly distinguished from *T. gambiense* by its great virulence for the majority of animal species; whereas in rats and mice *T. gambiense* has very variable virulence, some animals being refractory, others contracting light infections, *T. rhodesiense* invariably kills them. In the guinea-pig, dog, and Macacus monkeys the duration of *T. rhodesiense* infections is shorter than that of *T. gambiense* infections. In sheep and goats the difference in the evolution, symptomatology, and gravity of the two infections is quite remarkable; whereas *T. gambiense* infections in these animals often give rise to no symptoms except fever (often missed if one does not take the temperature), and usually end in recovery, *T. rhodesiense* infections lead to an acute disease, with high fever, oedema and keratitis, and death is invariably the end after a relatively short duration.

3. *Serum Reactions.*

(*a*) *Action of Immune Serum* (Mesnil and Ringenbach).—(1) A goat was infected with *T. rhodesiense.* Twenty-two days later its serum + *T. rhodesiense* was injected into a mouse. Result: Protection. (2) The serum + *T. gambiense* was injected into a mouse. Result: Infection.

(*b*) *Action of Baboon Serum.*—Contrary to *T. gambiense*, *T. rhodesiense* is very susceptible to human and baboon serum. Thus Mesnil and Ringenbach performed the following experiment: A dose of 1 c.cm. of baboon *(Papio anabis)* serum cured mice with *T. rhodesiense.* In the same dose it acted very feebly on *T. gambiense.*

Action of Human Serum.—One c.cm. of human serum cured *T. rhodesiense* mice in 3 out of 4 cases; on *T. gambiense* mice there was no appreciable effect.

Laveran and Nattan-Larrier have shown the same—namely, that human serums act on *T. rhodesiense*, but are quite without action on *T. gambiense.*

(*c*) *Trypanolytic Reactions.*—The results got by Mesnil and Ringenbach are most demonstrative in the case of trypanolytic reactions. The serums of animals (man, monkey, and guinea-pig) infected with *T. gambiense* are trypanolytic for the homologous trypanosome—that is, *T. gambiense*—but have no action on the heterologous trypanosome—that is, *T. rhodesiense.*

4. *Cross Immunity Experiments.*

(*a*) Mesnil and Ringenbach immunized a monkey (*Macacus rhesus*) against *T. gambiense.* It was inoculated with *T. rhodesiense* on June 7th, 1911; on June 27th trypanosomes appeared (the infection was slight); on July 4th it died. A control died in ten and a half days.

(*b*) Laveran immunized a goat and mouse against *T. gambiense;* when they had acquired a solid immunity they were inoculated with *T. rhodesiense.* They became infected like the controls.

(*c*) Laveran and Nattan-Larrier immunized a goat against *T. brucei;* it subsequently became infected with *T. rhodesiense.*

(*d*) Laveran immunized a ram and a sheep against different strains of *T. brucei.* Inoculated with *T. rhodesiense* they both acquired acute infections and died. Conclusion: *T. rhodesiense* is not *T. brucei.*

When the converse set of experiments is tried, namely, immunizing an animal against *T. rhodesiense*, and then inoculating with *T. gambiense*, the difficulty immediately arises that it is impossible to immunize an animal against *T. rhodesiense*, owing to its virulence. But a partial and transitory immunity to *T. rhodesiense* can be got by treating the infected animal with drugs, such as arsenophenylglycin. The results, so far as they go, seem to show that an animal immunized against *T. rhodesiense* is immune not only to *T. rhodesiense*, but also to *T. gambiense*, a fact which, according to Mesnil and Leger, does not invalidate the specificity, but tends to show that the two trypanosomes are closely related.

5. *Mode of Transmission.*

Although not regarding it as an absolute specific characteristic, it is interesting to note that according to Kinghorn and Yorke (1912):

(1) *T. rhodesiense* is transmitted by *Glossina morsitans*, both in laboratory experiments and in nature.

(2) That about 16 per cent. of the wild game examined in Northern Rhodesia is infected by *T. rhodesiense.*

6. *Curve of Measurements.*

We have measured 2,000 *T. rhodesiense* and the curve differs from that obtained by Surgeon-General Bruce for 1,000 *T. gambiense.*

Conclusion.

When we first announced this trypanosome it seemed to be very generally assumed that it was a variety of *T. gambiense*, and that its peculiarities were due to the fact that it was probably transmitted by *Glossina morsitans.* We have never held this view, as we considered that there were no facts to warrant such an assumption. We believe that sleeping sickness in Rhodesia, Nyasaland, and adjoining territories is due to a specific trypanosome, *T. rhodesiense;* that the disease is not due to *T. gambiense* recently introduced, on the contrary—though this may be difficult to prove—that it has existed in these territories from time immemorial.

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II.—F. K. KLEINE,

German East Africa.

THE IDENTITY AND MODE OF TRANSMISSION OF TRYPANOSOMES.

R. KOCH emphasized the fact that the pathogenic trypanosomes—for example, the pathogenic agent of sleeping sickness, nagana, surra, etc.—are not confined to one species of animal, and that they vary considerably in reference to their morphology and virulence. He considered that one must conclude therefrom that these parasites as contrasted with others only live a comparatively short time in the blood of their hosts, that they have not completely adapted themselves to them, and that they have not yet acquired the position of fixed species. He postulated a period of mutability. It appeared to him that similar conditions existed in the case

of trypanosomes to those which de Vries had found in his classical investigations on the mutation of *Oenothera*. In fact, the variations in size and morphology in individuals of the same trypanosome strain, especially if inoculated into another genus of animal, are not inconsiderable. Striking differences in virulence also exist, which can be increased or decreased at will. Data, however, are completely wanting as to trypanosome strains of the same origin which *completely* differed from one another in their virulence in the same species of animal, and which date back to that time when one actually only knew *T. brucei* intimately, and in that trypanosome, as a matter of course, one looked for the characters of this species, and naturally they frequently were not found. If the properties were not found, one considered that the fact proved quite special variations in virulence and peculiar immunity relationships.

In my opinion, in the case of most trypanosomes the period of mutability is passed. We have now before us sharply defined groups, differing in their pathogenicity and other biological properties, and I know of no case in which one has been able *fundamentally* to alter the whole character of a strain. To take an example. Through passages in the mouse I had raised, during the course of two years, the virulence of *T. gambiense* to such an extent that by intraperitoneal injection it killed mice almost always in two to three days. The characteristic susceptibility of man towards the strain, however, remained, as a laboratory assistant who was unfortunately bitten by a mouse fell ill soon after of sleeping sickness. Also all attempts to alter the specificity of trypanosomes in the body of *Glossinae* have proved fruitless. A number of clean *G. palpalis* were twice fed on sleeping sickness monkeys, and then always on healthy sheep or goats, until eventually some of the animals showed trypanosomes in their blood. On these infected animals freshly hatched flies were now fed four times, and then daily on sound sheep or goats. When the time arrived that the trypanosomes taken up by the *Glossinae* were about to become infective, I tested their infectivity by feeding the flies for comparison on healthy monkeys and goats. The result was that *T. gambiense*, in spite of its stay of many months in goat's and sheep's blood, both in the animal's body and in the fed flies, remained far more infective for the monkeys than for the other animal corresponding to its original specific characteristic. The fuller data of these experiments will shortly be published by Dr. Fischer and myself. As the specificity of the trypanosomes is a marked one, so in many cases inoculation into various animals suffices to establish their specificity. If we proceed always in a uniform way we get correspondingly satisfactory results. I will mention the chief points on which I lay stress.

The quantity of injected blood must not be too small (if possible, 5 to 20 c.cm.), so that it may be quite certain that numerous trypanosomes are injected. As many animals as possible must be injected. The injection must always be *subcutaneous*. If large intraperitoneal injections are used, certain trypanosomes can be transiently carried over into animals which are not actually susceptible to the particular species. To determine whether an injection is positive or not, *thick drops* must always be made for the blood examination. This method, first described by R. Ross and subsequently tested by R. Koch on his expedition to the Sese islands in hundreds of cases, is unfortunately still insufficiently well known and appreciated. An exact description will be found in *Sleeping Sickness Bureau Bulletin*, vol. iii, No. 31, p. 402. The fact that other authors have not got as good results as we ourselves depends mainly on changes of technique, whereby the fundamental principle of the method has been considerably injured. In cases where the method of identifying trypanosomes by injecting into different species of animals is employed this trustworthy method is indispensable, as it saves one from false conclusions. I conclude that when, using a technique free from all objections, one fails to infect by subcutaneous injection a particular species of animal with trypanosome-holding blood, that species is insusceptible. Many observers appear not to have this view. Thus in the *Sleeping Sickness Bureau Bulletin*, vol. i, No. 7, p. 274, there is an abstract of a paper, entitled "Cattle Trypanosomiasis in the Congo Free State," by Dutton, Todd, and Kinghorn, in which they state:

> The results of the animal inoculations show that animals we employed frequently remained uninfected after the inoculation of large quantities of blood containing many parasites. As a diagnostic test the subinoculation of laboratory animals was often, therefore, less sensitive than the examination of cover-slip preparations of blood. . . . Of twelve rats, four guinea-pigs, two rabbits, two monkeys, and four dogs inoculated at various stations, only one rat ever became infected . . . the virulence of various strains of trypanosomes (in the laboratory) may vary greatly. *The effect of a parasite on experimental animals can, therefore, only be taken as a general indication and cannot be accorded specific value.*

In our experience just the opposite is the case. When out of 4 guinea pigs, 2 rabbits, 4 dogs, and 12 rats, only 1 rat was infected, it at once passes through one's mind that the trypanosomes used were not infective for these animals. The infection of one rat was perhaps only a transient one, determined, perhaps, by intraperitoneal injection. It is self-evident that in identifying trypanosomes we regard not only their infectivity-pathogenicity, but also their properties. For instance, we do not omit investigation of fresh preparations. With regard to this we may state that the motility of individuals of the same strain is not always the same. Trypanosomes which one day move actively out of the field, in a few more travel either sluggishly or only move about the same spot. They remain together attached to the red cells, and endeavour in vain to get free. This phenomenon is very likely produced by the formation of antibodies, which for a time check the motion. It is questionable, therefore, whether one can ascribe any great significance to motion through the field. It is certain, at any rate, that some trypanosomes—for example, *T. cazalboui*, are naturally characterized by quite remarkable rapidity of motion. If a trypanosome "shoots" through the field like a spirochaete, *T. brucei*, *T. gambiense*, and others do not come into consideration in the diagnosis. On the other hand, slight motility does not, as a matter of course, exclude a trypanosome from the *cazalboui* group, as in chronic infections also we have found the motility considerably diminished. In estimating morphological characters we must not forget that most of the different trypanosomes show a certain dimorphism which naturally is more striking in the larger than in the smaller species.

All the data regarding the size of a trypanosome vary not inconsiderably as the individuals of one and the same strain vary in themselves in size, and, again, there is no correspondence in methods of fixation and measuring. We may hope that Bruce's methods will effect a considerable advance in this respect. For instance, the difference between his two curves of *T. evansi* and *T. brucei* is extraordinarily instructive, but how far it will allow us to identify *T. gambiense* the future must show. Bruce himself expresses himself very carefully and sceptically. While, then, from these points of view, it should not be as a rule difficult to identify animal trypanosomes, our skill fails us when we come to human trypanosomes. For obvious reasons, in the case of human trypanosomes, we cannot avail ourselves fully of our chief method of diagnosis—namely, the testing of the infectivity—if we find, for example, in a *G. morsitans* country a trypanosome in a goat which on certain grounds we take to be *T. gambiense*, yet the proof is not easily furnished. In such cases we turn to other methods.

Laveran tests the identity of trypanosomes by cross inoculations of immunized animals. A disadvantage of the method is the long time it takes. Further, in many animals an immunity cannot be produced against the trypanosomes highly pathogenic for that particular animal. Also, after the lapse of time animals apparently immune succumb to the infection or to intercurrent disease, especially if any unfavourable external conditions diminish their existence. If one uses, however, for purposes of immunization, animals which further first possess a great resistance to the trypanosome in question, the certainty of the conclusion suffices. For African conditions serum reactions are in many cases more applicable.

In 1905 I was able to distinguish with certainty *T. brucei* from *T. gambiense* by means of the serum of two donkeys whose relative immunity against tsetse (Nagana) was pronounced, though both animals died eventually of the disease. Their serum in a dose of 0.5 c.cm., given subcutaneously, protected mice from an intraperitoneal injection twenty-four hours later of 0.2 c.cm. of a Nagana blood emulsion. The controls died

in four to five days. On the contrary, the serum specific for *T. brucei* did not protect against *T. gambiense* even in repeated doses.

Laveran and Mesnil have systematically used and recommended the serum of immunized animals for the identification of trypanosomes. The French savants mix in increasing doses 0.25 to 1.00 c.cm. of immune serum with some blood containing the trypanosome to be tested. The mixture is allowed to stand for five minutes, and is then injected into the peritoneum of white mice. As a control a mixture of 0.5 c.cm. of normal serum with the trypanosome blood is used. The advantage of serum diagnosis is that one can use the serum of relatively immune chronic cases—animals, as in my case—the disadvantage is that the specific property of the serum and the virulence of the trypanosome to be tested vary much, so that the certainty of the diagnosis suffers. Yet in the identification of human pathogenic trypanosomes one can scarcely dispense with the method of serum diagnosis.

Identification of the pathogenic mammalian trypanosomes is not possible in the tsetse fly. Yet, with some practice, forms derived from cold-blooded animals can be distinguished from those of warm-blooded ones. In *Glossina*, trypanosomes pass through a development, as is well known, and personally we are convinced it is a sexual one. The analogies from other protozoa favour this view; besides one finds in the fly two quite different types of trypanosome appearing beside one another—they are male and female. The first are characterized by their size and breadth. The abundant plasma stains blue with Romanowsky, and is generally filled with numerous granules of chromatin or volutin. The nuclear chromatin is not compact, but loose, and not uncommonly it is arranged in eight chromosomes, rosette-wise. Many of these parasites which we must call females have two or more nuclei. Males, on the contrary, we designate the quite thin and slender forms, the protoplasm of which stains in a reddish shade with Romanowsky. The rod-shaped, elongated nucleus lies, as a rule, fairly near the hind end, and it is compact and intensely stained. In these cases where the blepharoplast is clearly separated from the main nucleus, one sees that it generally lies anterior to the main nucleus.

The two past described types R. Koch was the first in main essentials to designate as male and female. Beside the microscopical appearances, another observation appealed to him as of force for the assumption of sexual development.

He twice found trypanosomes in thes alivary glands of caught *G. palpalis*. On the contrary, I frequently failed in my experiments with reared flies to find parasites in the salivary glands of infective ones. Sir David Bruce, on the other hand, published some time ago experiments from which it appeared that the infection of the salivary glands was a preliminary necessity for the infectivity of the flies. The matter is not yet cleared up. I consider it for my part an error, especially as it is quite possible that the salivary glands can be infected secondarily from the proboscis. In my earlier method of dissection, unfortunately, the thoracic portion of the salivary glands remained unexamined. All trypanosomes do not develop in the gut of the fly; according to Bouffard's interesting observation, they are in the case of *T. cazalboui* confined to the proboscis.

Of special scientific interest appears to be Minchin and Thomson's discovery of intercellular stages of *T. lewisi* in the rat-flea. May it be the beginning of still further elucidation of what are as yet quite obscure developmental processes.

In general, at the present time, our theoretical knowledge shows grievous gaps. This is explained by the difficulty of the subject and by the natural desire of most active workers in the struggle against sleeping sickness to elucidate above all important practical points—namely, the mode of transmission, the heredity of the trypanosomes, etc.

The results of my experiments, which permitted a mechanical transmission of sleeping sickness and nagana as only exceptional occurrences, and excluded the hereditary transmission of the pathogenic trypanosomes in the fly, have been recognized since as correct, are beyond discussion. It is practically established that a fly which has once become infective remains so for the rest of its life. At the present time the solution of the question whether any species of trypanosome can be transmitted by any species of *Glossina* is important. The experiments of Bruce, Hamerton, Bateman, and Mackie, of Bouet and Roubaud, of Fischer, and others favour this view. Dr. Taute, at my suggestion, attempted to convey sleeping sickness on Tanganyika by means of *G. morsitans*, with the result that he succeeded in infecting the flies in a not inconsiderable percentage. Lately he has completed his investigations, in which he made use of eight different strains of human trypanosomiasis from the Tanganyika district. The transmission was always successful, also in the case of two strains which he had procured from monkeys from Lake Victoria. In opposition to these laboratory experiments stand the natural epidemiological conditions, in virtue of which sleeping sickness is bound up with the appearance of *G. palpalis*. The connexion appears to be, however, no longer quite insoluble, as in addition to those cases of sleeping sickness without *G. palpalis* in Nyasaland, now also a dozen cases are known in German territory in a district (on the Rovuma river) where only *G. morsitans* exists. It is not impossible, however, that sleeping sickness does not depend on the existence of *G. palpalis* to the extent that is believed, but that one only accidentally recognized the epidemic just at the moment when it was on the point of emigrating from West Africa with its fauna to East Africa.

III.—F. Mesnil,

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TRYPANOSOMA RHODESIENSE AND TRYPANOSOMA GAMBIENSE.

It is to a former worker at the Liverpool School of Tropical Medicine, the regretted Dutton, that we owe the discovery of the first human trypanosome, *T. gambiense*, rediscovered a year and a half later by Castellani and Bruce as the pathogenic agent of sleeping sickness. It was again from the Liverpool School of Tropical Medicine that the announcement was made that there exist in the English protectorates of Rhodesia and Nyasaland another human trypanosome, the *Trypanosoma rhodesiense* (Stephens and Fantham). Very generously the workers of Liverpool, through the intermediary of Dr. W. Yorke, have sent me in the spring of 1911 their new strain. It is an agreeable duty for me to thank them by sending for the congress which takes place in their city a brief summary of the facts that my collaborators, Drs. Ringenbach, M. Leger and M. Blanchard, of the Colonial Service, and I have been able to collect regarding the trypanosome of Rhodesia.

First, we confirmed the morphological facts on which Stephens and Fantham had based their species, and the pathological characteristics recorded by Yorke concerning the great virulence of *T. rhodesiense* in various mammals—namely, rats, mice, Macacus, goats, and sheep. Studies pursued in my laboratory on two races of *T. gambiense* during the last seven and four years respectively in the three first named species of mammals have further strongly confirmed the results obtained at Liverpool. One of the strains of *T. gambiense* is relatively virulent for these species of mammals. It was the one used by Yorke as the basis of comparison.

Granted the marked virulence of *T. rhodesiense* for a number of mammals, it seemed well to determine whether vertebrates regarded as refractory or little susceptible to *gambiense* would not be more easily infected by *T. rhodesiense*. From this point of view no difference could be found between the two human strains.

Cynocephalus is refractory to *T. rhodesiense*, also to *T. gambiense;* with either virus one obtains abortive infections in *Cercocebus fuliginosus* (Mesnil and Ringenbach). Pigs acquire with each virus a slow infection which terminates in recovery (Mesnil and Blanchard). Fowls, regarded up to the present as refractory to *gambiense*, acquire, after inoculation in the wattles, a scanty infection as regards the presence of trypanosomes—which can only be seen by inoculation into the blood of rats or by centrifuging the blood—but which leads generally to death in one to three months. On two occasions out of four there appeared conjunctivitis and keratitis. Our results with *T. rhodesiense* have been

quite comparable to the preceding results (Mesnil and Blanchard).

Since the researches of Laveran, *T. gambiense* has been regarded as refractory to human serum employed either as a preventive or a curative. The very marked action of the serum of *Cynocephalus* on *T. rhodesiense* has led Ringenbach and myself to suspect an action with human serum also, and we have discovered that this serum in doses of 1 c.cm. generally prevents infection in mice, or leads to quick recovery if infection occurs. This new property affords, in addition to the difference in virulence, a means of separating the two strains, and shows that the trypanosome of Rhodesia dehumanizes itself ("*se déshumanize*") quickly. Further researches have proved that *T. gambiense* can also "dehumanize" itself, becoming sensitive to human serum; such is the case at the present time with our strain (of *T. gambiense*) kept in the laboratory for the last seven years. Between the sensitiveness of this virus to human serum and that of *T. rhodesiense* there is an appreciable difference.

The experiments on active or passive cross immunity are among the best for the identification of trypanosomes. Regarding this question Ringenbach and I obtained the first results. We have used a *Macacus rhesus* having a solid immunity for *T. gambiense*. It became infected after inoculation with *T. rhodesiense*, but its infection was considerably slower than that of the control. This experiment has been followed by others which we owe to Professor Laveran, in which this worker showed, *inter alia*, that a male goat immunized for *T. gambiense* could be infected with *T. rhodesiense*, just like a female goat used for control; in fact, the former died several days before the latter.

It is clear that these results support the individuality of these two human species of trypanosome. It would be most interesting to complete the cross immunity experiments by inoculating an animal which had already acquired active immunity for *T. rhodesiense* with with *T. gambiense*. M. Leger and I have attempted this, as far as it is possible, by inoculating *T. gambiense* into mice which have recovered from an infection of *T. rhodesiense* after treatment with arsenophenylglycin. The delay in the controls attaining even complete recovery can only be interpreted, we think, as a proof of the relationship of the two strains.

Lastly, Ringenbach and I have been able to try cross experiments as regards protection, trypanolysis and attachment with the serums of Congolese sleeping sickness patients and animals showing a chronic infection with *T. gambiense* or *T. rhodesiense*. The majority of our results favour a differentiation of the two trypanosomes. Thus, the trypanolytic reaction, in general positive to the homologous trypanosome, is usually negative to the heterologous trypanosome. The reaction of attachment, when it is positive, is so usually only with the homologous trypanosome. The reaction of protection has given us conflicting results. Regarding sleeping-sickness serums, the reaction is difficult to carry out, especially with *T. rhodesiense*. One can attain it by using a strain which is refractory to normal human serum. We have seen thus in two cases that specific serum no longer acted. The serum of the *rhodesiense* goat, active to the homologous strain, was no longer so to the heterologous strain. On the other hand, Blanchard and I have found that the serums of the two pigs, mentioned before, protected equally well to the homologous or heterologous trypanosome.

Taking all these facts together it follows:

1. That there is a marked differentiation between the two human trypanosomes of Africa, and that the creation of a new species for the trypanosome of Rhodesia is rendered legitimate.

2. But that these two species are more closely allied to each other than any other two known species of trypanosome.

IV.—ALLAN KINGHORN and WARRINGTON YORKE,
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TRYPANOSOMES INFECTING GAME AND DOMESTIC STOCK IN THE LUANGWA VALLEY, NORTH-EASTERN RHODESIA.

WITHIN the confines of the Luangwa Valley a numerous and varied selection of game is found, but, doubtless due to the fact that *Glossina morsitans* is everywhere abundant, domestic stock is extremely scarce, and in many districts non-existent. Whilst cattle were found in one village only, a few dogs and goats were met with on several occasions.

Examination of Game.—In practice it was found that trypanosomes were more readily detected in a buck's blood by the examination of thin, stained smears, than by that of fresh preparations. Apart from isolated instances, several hours elapsed after an animal had been shot before its heart reached the laboratory, and this, together with the great heat, had a very deleterious effect on the parasites, destroying their motility, and permitting degenerative changes to occur. On the several occasions on which fresh preparations made under these conditions were examined in conjunction with thin blood films made in the field, and afterwards stained, no trypanosomes were found in the former, whilst they were recognized in the permanent stained preparations.

Owing to the impossibility of obtaining clean sheep and goats, all inoculations from game were made into monkeys and rats, the amount of blood used varying from 1 to 10 c.cm. That sheep and goats were not available was unfortunate, since these animals are susceptible to several trypanosomes—for example, *T. vivax* and *T. nanum*, which do not readily infect the smaller laboratory animals.

A total of 127 head of game, comprising 19 genera, were examined at Nawalia, and trypanosomes were found by direct examination, by inoculation, or by both methods, in 33, and by direct examination only in 26. The latter is a high figure for single observations, and it is probable that had several preparations from each buck been searched, the percentage of successes would have been much greater. Occasionally only a single parasite was found in a film covering the greater portion of a slide, and this after a very careful examination extending over two hours.

A more accurate estimate of the true percentage of game harbouring trypanosomes is afforded by considering only those from which inoculations were made. An analysis of these gives the following figures:

Number of inoculations made...		56
Number of positive inoculations in which parasites were found in buck's blood	8	
Number of positive inoculations in which no parasites were found in buck's blood... ...	7	
Number of negative inoculations in which parasites were found in buck's blood	6	
Total number found infected		21

These figures show that at least 37.5 per cent. of the local fauna were infected with trypanosomes. Both *T. vivax* and *T. nanum* were found by direct examination of buck's blood, and to both of these species monkeys and rats are refractory, so that no conclusions can be drawn regarding the presence or absence of these parasites in animals in which trypanosomes were not detected in blood smears. Had sheep or goats been available for inoculation, it is probable that many more buck would have been found to be infected with the parasites in question. As a conservative estimate, the percentage of game actually infected with trypanosomes in the vicinity of Nawalia might be placed at 50.

In Table I is given the species of trypanosomes occurring in each animal in which parasites were found. In compiling the table, information obtained from the results of inoculations, where these were made, has been utilized. This enables a differentiation to be made between such species as *T. pecorum* and *T. nanum* which are morphologically indistinguishable. *T. vivax* has a characteristic morphology and can thus be identified in blood smears without difficulty.

As would be expected, double infections in game are not uncommon and several instances are recorded in the table. No data exist as to the ultimate effect of infection on game. All the animals which were shot appeared to be in perfect condition and presented no signs of disease. Whether or not buck succumb to trypanosomiasis it is impossible to state, but as they have steadily increased in numbers since rinderpest swept through the country, it may be assumed that their tolerance to trypanosomes is very great.

TABLE I.—*Trypanosomes Found in Game.*

Animal.		Trypanosomes Found in Peripheral Blood.	Trypanosomes Isolated by Inoculation into Monkeys and Rats.	Diagnosis.
Bushbuck	1	Negative	T. pecorum	T. pecorum.
,,	2	T. pecorum or T. nanum	Negative	T. nanum.
,,	3	T. sp.	T. sp.	T. sp.
,,	4	T. pecorum or T. nanum	No inoculation	T. pecorum or T. nanum.
,,	5	Negative	T. rhodesiense	T. rhodesiense.
,,	6	T. pecorum or T. nanum	No inoculation	T. pecorum or T. nanum.
Waterbuck	1	T. pecorum or T. nanum	T. pecorum	T. pecorum.
,,	2	T. pecorum or T. nanum	T. pecorum and T. rhodesiense	T. pecorum and T. rhodesiense.
,,	3	T. pecorum or T. nanum and T. vivax	Negative	T. nanum and T. vivax.
,,	4	T. pecorum or T. nanum	Negative	T. nanum.
,,	5	Negative	T. pecorum	T. pecorum.
,,	6	T. vivax	Negative	T. vivax.
,,	7	T. vivax	Negative	T. vivax.
,,	8	T. rhodesiense	T. rhodesiense	T. rhodesiense.
,,	9	T. pecorum or T. nanum and T. vivax	Negative	T. nanum and T. vivax.
,,	10	T. pecorum or T. nanum	No inoculation	T. pecorum or T. nanum.
,,	11	(?) T. rhodesiense	Animal died the day after inoculation	(?)T.rhodesiense.
,,	12	T. rhodesiense	T. rhodesiense and T. pecorum	T. rhodesiense and T. pecorum
,,	13	T. vivax	No inoculation	T. vivax.
,,	14	T. rhodesiense and T. vivax	T. rhodesiense	T. rhodesiense and T. vivax.
,,	15	T. vivax	No inoculation	T. vivax.
,,	16	(?) T. rhodesiense and T. vivax	No inoculation	(?) T.rhodesiense and T. vivax.
,,	17	(?) T. rhodesiense	No inoculation	(?)T.rhodesiense.
Kudu	1	Negative	T. pecorum	T. pecorum.
,,	2	T. pecorum or T. nanum	No inoculation	T. pecorum or T. nanum.
,,	3	T. pecorum or T. nanum	T. pecorum	T. pecorum.
,,	4	T. pecorum or T. nanum	No inoculation	T. pecorum or T. nanum.
Roan	1	T. pecorum or T. nanum	No inoculation	T. pecorum or T. nanum.
Warthog	1	Negative	T. rhodesiense	T. rhodesiense.
Puku	1	T. vivax	No inoculation	T. vivax
Mpala	1	Negative	T. rhodesiense	T. rhodesiense.
,,	2	T. pecorum or T. nanum	T. pecorum and T. rhodesiense	T. pecorum and T. rhodesiense.
Hartebeeste	1	Negative	T. rhodesiense	T. rhodesiense.

Examination of Domestic Stock.—The domestic animals examined and the species of trypanosomes found in them are given in Table II.

TABLE II.—*Examination of Domestic Stock for Trypanosomes.*

Animal.	Trypanosomes Found in Peripheral Blood.	Trypanosomes Isolated by Inoculation into Monkeys and Rats.	Diagnosis.
Cow	T. pecorum or T. nanum	No inoculation	T. pecorum or T. nanum.
Cow	T. pecorum or T. nanum	Result not yet known	T. pecorum or T. nanum.
Goat No. 39 ...	T. vivax	Negative	T. vivax.
Goat No. 94 ...	T. vivax and T. nanum or T. pecorum	Negative	T. vivax and T. nanum.
Goat No. 202...	T. pecorum or T. nanum	Negative	T. nanum.
Goat No. 258...	T. vivax	Negative	T. vivax.
Dog	T. rhodesiense	T. rhodesiense	T. rhodesiense.
Dog	T. pecorum	T. pecorum	T. pecorum.
Dog	T. pecorum	No inoculation	T. pecorum.
Dog	T. pecorum	No inoculation	T. pecorum.
Dog	T. sp. (? montgomeryi)	Negative	T. sp. (? montgomeryi).

The only native village in which cattle were found was Kambwiri's, some forty miles south-east of Nawalia. At present there are only three head, all that are left of a big herd which existed there some four or five years ago. Two of the three appeared to be in good condition when last seen, but the headman of the village fully expected to lose them within a few months. The third beast was obviously ill. The cow in which trypanosomes were found at Fort Jameson was bred on the Government farm and had never been beyond the limits of the township. Tsetse flies have not been seen within some miles of the place, but *Stomoxys* is abundant in the kraals, and at certain seasons of the year various species of *Tabanidae* are common.

In several of the villages on the main road from Nawalia to Fort Jameson a number of goats were found at the end of August, 1911, and again at the beginning of April, 1912, but at the end of that month not a single animal was alive. *Glossina morsitans* was found around all these villages. The four goats mentioned in Table II were under observation at Nawalia for a considerable length of time. During this period parasites were found in the peripheral blood only at rare intervals. Two were rather thin, but, apart from this, there were no signs of disease. Goat 258 was examined at frequent intervals for two months before parasites were first found, while in the others trypanosomes were found on the first occasion. Nos. 39 and 258, after having been under observation for nine and four months respectively, died on the road when the Commission left Nawalia, most probably from being overdriven. The other two are still alive, seven and four months after the diagnosis was made. The dog in which *T. rhodesiense* was found came from a village on the Nyasaland border. The natives said that it had not been out of the village for over a year previously. As the disease runs an extremely acute course in these animals, there can be no doubt that the dog was infected locally.

The following is a brief description of the various trypanosomes found in game and domestic stock:

1. *Trypanosoma rhodesiense.*—This organism was found in 4 waterbuck, 2 mpala, 1 hartebeeste, 1 bushbuck, and 1 warthog—16 per cent. of the game from which inoculations were made—and from 1 native dog. As the trypanosome has been dealt with fully in previous reports,[1] no further description is required.

2. *Trypanosoma vivax.*—This organism was found in 8 waterbuck, 1 puku, and 3 goats. It is a more or less club-shaped parasite with a long free flagellum. The greatest width is posterior to the nucleus, which is situated about the middle of the body. The blepharoplast is large and rounded, and lies close to the posterior extremity. The undulating membrane is feebly developed or absent. Mean length of 125 trypanosomes 23.3 μ, maximum 28.25 μ, minimum 19.75 μ. The greatest width varied from 2 to 4.25 μ, average 3.2 μ. The trypanosome was innocuous to monkeys, rabbits, and rats.

3. *Trypanasoma nanum.*—Found in the following animals: 1 bushbuck, 3 waterbuck, and 2 goats. Possibly it was also present in 2 other bushbuck, a fourth waterbuck, 2 kudu, a roan, and 2 cattle, but, as no subinoculations were made from these animals, it was impossible to differentiate the parasite from *T. pecorum*. It is a short aflagellar parasite, with a more or less rounded posterior extremity, from which the body tapers forward to the acute anterior end. Blepharoplast small, and terminal or latero-terminal. The mean length of 175 individuals was 14.4 μ, maximum 19 μ, minimum 10 μ. The breadth, at the level of the nucleus, varied from 1 to 2.25 μ, average 1.5 μ. Monkeys, rabbits, and rats were insusceptible.

4. *Trypanosoma pecorum.*—Found in the following animals: 1 bushbuck, 1 mpala, 4 waterbuck, 2 kudu, 3 dogs, and 1 wild rat. Possibly it was present in 2 other bushbuck, a fifth waterbuck, 2 other kudu, a roan, and two cattle, but, as mentioned previously, it could not be distinguished from *T. nanum* in the absence of subinoculations from these animals. The parasite is identical morphologically with *T. nanum*. Monkeys, rabbits, guinea-pigs, rats, and mice were readily infected with the trypanosome.

5. *Trypanosoma sp.*—This parasite, which has not yet been fully worked out, was isolated from one bushbuck. It is markedly polymorphic, exhibiting every gradation between extremely short, aflagellar forms indistinguishable from *T. pecorum*, and long, slender, free flagellated parasites closely resembling the corresponding forms of *T. brucei* or *T. gambiense*. The mean length of 525 individuals was 20 μ, maximum 33.25 μ, minimum 10.75 μ. The curve giving the percentages of the various lengths of the parasites encountered in an examination of 525 individuals differs unmistakably from that of *T. gambiense*. The apex of the curve occurs at 17 μ.

Monkeys, rabbits, and rats were infected, but the disease ran an exceedingly chronic course in all. One guinea-pig was inoculated with the trypanosome, but was refractory.

6. *Trypanosoma sp. (? montgomeryi).*—Found in one dog which came from a village on the Nyasaland border. At first sight

the parasite resembles *T. pecorum*, but on closer examination it is readily distinguished from this organism by its great breadth. The ratio of breadth to length is 1 to 4.8. The posterior extremity is rounded, the anterior attenuated. The greatest width lies at the level of the nucleus, or posterior to it. The blepharoplast is very large, and is situated near the posterior extremity. Frequently it lies at one edge of the trypanosome and projects laterally as a small excrescence. The undulating membrane is, as a rule, absent, and when present is simple and feebly developed. Occasionally a short free flagellum, 1 to 2 μ in length, is to be seen, but this is generally absent. The cytoplasm often contains coarse granules and vacuoles. The average length of 200 individuals was 15.88 μ, maximum 20 μ, minimum 10 μ. The breadth, at the level of the nucleus, varied from 1.25 to 6.5 μ, average 3.29 μ. One rat, subinoculated from the dog, had not become infected up to the thirteenth day, when it was accidentally killed. Unfortunately the dog died some days previously, so that the strain was lost.

It will be seen that, morphologically, this parasite differs widely from *T. pecorum*. The average length is greater, 15.88 μ as compared with 13.6 μ. The most characteristic difference, however, is the great breadth of the organism, which is, on an average, 2.2 times that of *T. pecorum*—average breadth 3.29 μ, as compared with 1.5 μ. It appears to resemble most closely the parasite described by Montgomery and Kinghorn[2] as the Ninamwenda, strain, and for which the name *Trypanosoma montgomeryi* was proposed by Laveran. But in view of the fact that we were able to examine material from one dog only, we cannot regard its identity with this parasite as established.

SUMMARY.

1. Trypanosomes are of frequent occurrence in game and domestic stock in the Luangwa Valley. At least 37.5 per cent. of the buck harbour parasites.

2. Six species of trypanosomes were found—namely, *T. rhodesiense*, *T. vivax*, *T. nanum*. *T. pecorum*, and two others, of which one was possibly *T. montgomeryi*.

3. *Glossina morsitans*, in nature, transmits two of these trypanosomes—namely, *T. rhodesiense* and *T. pecorum*, and probably also transmits at least two others—namely, *T. vivax* and *T. nanum*.

REFERENCES.

[1] Kinghorn and Yorke, *Annals of Tropical Medicine and Parasitology*, vol. vi, IA, 1912.
[2] Montgomery and Kinghorn, *Annals of Tropical Medicine and Parasitology*, vol. iii, No. 2, 1909.

V.—S. B. WOLBACH, M.D., and C. A. L. BINGER,
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A CONTRIBUTION TO THE PATHOLOGICAL HISTOLOGY OF TRYPANOSOMIASIS.

Introduction.

IN this work we have endeavoured to ascertain the distribution of trypanosomes in tissues, and the factors concerned in the production of the lesions in trypanosomiasis. The generally negative results of work directed towards the artificial production of immune phenomena led us to believe that the relationship of the trypanosomes to the lesion must be a very direct one. The work was stimulated by the acquisition of a reliable technique for the demonstration of trypanosomes in tissues. The staining technique is modified from that published by Giemsa in 1910.[1] The important modification is a substitution of a 15 per cent. solution of colophonium in acetone for the xylol-acetone mixtures recommended by Giemsa for differentiation of the stained sections. With this change, and special care in securing perfect fixation, and sections of two microns in thickness, trypanosomes may be stained with the same regularity that the tissue elements are stained. The trypanosomes in skilful preparations show all structures including flagellum well stained.

The strains of trypanosomes used came from the Runcorn Laboratory. They are *Trypanosoma gambiense* from the French Congo, and *Trypanosoma brucei* from Uganda. The results are based upon a study of twenty animals, including rats, guinea-pigs, and three *rhesus* monkeys. The lesions were studied in every instance in parallel sets of tissues fixed in Zenker's fluid and stained by the eosin-methylene blue method. Special stains, such as Mallory's connective tissue stain and phosphotungstic acid hematein stain, were employed on occasions. The last stain is especially useful in the recognition of young fibroblasts, as it stains the characteristic fibrils, which are not produced by endothelial cells.

Pathology.

We have been able to add practically nothing to the pathological history. The striking reaction in all organs is the endothelial cell proliferation, which has been described by many workers. A slight contribution is the demonstration of an intravascular proliferation of endothelial cells in lungs, liver, and kidneys, and subsequent fibrosis. The former process, we believe, demonstrates the source of the increase of large mononuclear cells in the blood in trypanosomiasis. The amount of endothelial cell proliferation in the lungs and kidneys may produce obliteration of the capillaries. In the case of the lungs there may be marked thickening of the alveolar walls and collapse of the alveoli in small foci throughout the lung. Giant cell production occurs, and occasionally alveoli are filled with giant cells. Ingrowth of connective tissue into the alveolar walls follows. In the kidney the condition might well be termed an intra-capillary glomerular nephritis. Here, also, fibrosis is an end result.

The production of external gross lesions in the guinea-pig with *Trypanosoma gambiense* has been observed in six instances and studied in three. These lesions are similar to those produced by other trypanosomes in guinea-pigs (*T. brucei*, *T. hippicum*) and by *Trypanosoma gambiense* and other trypanosomes in other animals. The lesions began as oedema of the eyelids, perineal region, and skin of the back. The oedematous tissues became brawny in consistence, there was loss of hair, and in some instances ulceration. The condition of the eyelids was accompanied by conjunctivitis.

The pathology of the skin lesions is interesting in that there are collections of endothelial cells and giant cells, rather like the lesions of kala-azar. The endothelial cells and giant cells contain remains of trypanosomes. The process affects the skin, subcutaneous tissues, including fat, and muscle panniculus. In each tissue the process is the same—oedema with a slight deposit of fibrin, infiltration with lymphoid cells, plasma cells, and endothelial cells, giant cell formation, and fibrosis. The proliferation of connective tissue cells is fairly rapid in the corium and in the subcutaneous fat.

Distribution of Trypanosomes in Tissues.

We feel warranted in making the following statements:

1. That trypanosomes leave the vessels and are found in the tissues of all organs, showing, however, a decided preference for connective tissue structures.

2. That the lesions of trypanosomiasis, including focal infiltrations in the parenchymatous organs, the infiltration of the meninges, perivascular infiltration in the brain and other organs, and the oedema and subsequent changes in the skin and underlying tissues, are due to the presence of the trypanosome in the affected tissue.

The preference of trypanosomes for connective tissue structures heightens the numerous analogies between trypanosomiasis and syphilis, in that the *S. pallida*, as far as is known, is found most abundantly in connective tissues (primary lesions, gummata, and lesions of blood vessel walls). In two monkeys infiltration of the meninges and perivascular infiltration in the brain were obtained. Trypanosomes were found in both locations in both monkeys. In the monkey that survived the longest, trypanosomes were numerous in both locations, and were found in numbers migrating through the substance of the brain.

Morphology of Trypanosomes in Tissues.

Wherever found, the majority of the trypanosomes have the typical flagellate form. Dividing forms can be recognized almost as easily as in blood films. Rounded forms are found in fair numbers, mostly within endothelial leucocytes. We have no evidence that these rounded forms are other than the remains of partially destroyed trypanosomes. We are certain, at least, that most of such forms go on to complete destruction, as is evidenced by the finding in endothelial leucocytes and giant cells of many inclusions of a chromatoid nature. Rarely forms have been encountered within phagocytes which were round or oval in shape, and consisted of a well-stained cytoplasm, nucleus, and blepharoblast. It is probable that such forms are viable.

REFERENCE.

[1] G. Giemsa, Ueber die Färbung von Schnitten mittels Azur-eosin, *Deut. med. Woch.*, 1910, S. 12, p. 550.

PAPERS DEALING WITH LEPROSY.

I.—Charles Duval, M.D.

THE ORGANISMS ISOLATED FROM THE LESION OF HUMAN LEPROSY.

Since the discovery by Hansen in 1872 of an acid-fast bacillus in the leprous lesion to which he ascribed an etiological rôle numerous investigators have reported success with its artificial cultivation. It may be stated, however, that prior to 1901 the cultures isolated and described by various investigators differed tinctorially and morphologically from the Hansen bacillus of the tissues, and, although many of these cultures were said to have induced experimental lesions similar to human leprosy and to have fulfilled other postulates, no one of them has been universally accepted as the specific organism of leprosy.

A review of the literature, together with a careful study of the cultures which have been isolated from the leprous lesion by different workers throughout the world, has convinced me that two, and possibly three, apparently different germs have been described as the causal agent of leprosy, namely: (1) A non acid-fast diphtheroid (Kedrowsky), (2) an acid-fast chromogenic bacillus (Clegg), (3) non-acid-fast and acid-fast interlacing and filamentous streptothrix (Rost and Williams), and (4) a permanently acid-fast bacillus, which *in vitro* maintains the morphology of the Hansen bacillus of the tissues, and grows under artificial conditions only in the presence of special nutrients (Duval).

Whether the various cultures reported as the Hansen bacillus represent the same or distinct species, some one of which is the real exciter of leprosy and the others simply extraneous or accidental commensals, is a problem which I have attempted to solve by a comparative study of the lesions induced experimentally, the behaviour of the cultures with respect to immune serums, and by other well known methods. Furthermore, I have gone back over some of the leprosy cases formerly studied by me to determine, if possible, which yield the types above mentioned. I have also attempted to establish an etiological rôle for some one of these cultures, to the exclusion of others, by means of serum reactions and histological differences in the experimentally induced lesion.

Kedrowsky in 1901 described an organism which he cultivated from the leprous lesion, and believed to be the specific bacillus of leprosy. This author described his culture as a non-acid-fast diphtheroid bacillus, which when injected into laboratory animals became acid-fast after a sojourn of weeks in the tissues. He advanced the theory that the acid-fast rods seen in human leprous lesions represent but a stage in the developmental cycle of a single pleomorphic species.

Deycke and Rost and Williams have since reported (1905) upon the successful cultivation from the leprous nodule of an organism similar to that of Kedrowsky, together with which they also found streptothrical forms and acid-fast rods.

More recently Bayon (1912) describes a non-acid-fast diphtheroid obtained from a leper which behaves in a like manner to Kedrowsky's culture—that is, the initial growth from the tissues is non-acid-fast and a diphtheroid until passed through rats, after which it permanently changes into a typical acid-fast bacillus. Like Rost and Williams, he also mentions streptothrical forms in his culture. He concludes that not only is his culture identical with Kedrowsky's, but also that it is the cause of human leprosy, basing his argument upon specific reactions obtained with human leper serum, and also upon the production of characteristic lesions in laboratory animals.

Clegg in 1909 announced his success in the cultivation of an acid-fast bacillus which he isolated from lesions in a large series of lepers in the Philippines. He reported that multiplication in each instance occurred in the transferred leprous tissue bits when planted with amoebae and their symbionts. He subsequently obtained pure cultures of acid-fast organisms on the ordinary laboratory media as a moist profuse pigmented growth after heating at 60° C. for thirty minutes to kill out the symbionts.

Duval (1910) described a method by which the acid-fast bacilli in the leprous lesion could be cultivated *in vitro* without the use of symbionts. His culture differed from Clegg's in that it did not produce pigment, and refused to grow except upon special nutrients; however, subsequently many of his cultures became rapid growers and chromogenic.

Acid-fast cultures similar to Clegg's have been reported by Brinkerhoff and Currie in Honolulu, Rivas in Philadelphia, Thompson in Australia, Wellman in California, and other workers in Hawaii.

The work of Rost, Williams, Kedrowsky, Bayon, and others who have cultivated organisms other than acid-fast rods from leprous lesions, tends to show that the organism of leprosy is "an extremely pleomorphic streptothrix" which under certain circumstances may be: (1) A non-acid-fast streptothrix with interlacing filaments; (2) a non-acid-fast diphtheroid bacillus, which is in reality a streptothrix, and capable of becoming acid-fast under certain defined conditions; (3) a definite acid-fast filamentous streptothrix; and (4) an acid-fast bacillus which is the broken-down stage of a streptothrix.

Acid-fast and non-acid-fast filamentous forms I have also encountered in certain of the cultures which become chromogenic and rapid growers. These curious forms I regarded at the time as "involutions" or degenerations of the species. However, by plating and transplanting colonies from the Clegg type of culture, non-acid-fast streptothrices and acid-fast diphtheroids were recovered, and these are convertible into acid-fast rods by alterations in the reaction of the medium, etc. It is not necessary to pass the culture through an animal to bring about this change.

Branching non-acid-fast streptothrices I have never noted in any of the cultures, which so far are non-chromogenic and refuse to multiply except upon special media.

Since we may encounter in the leprous lesion an associated pleomorphic acid-fast organism which is capable of changing *in vitro* under defined conditions, it is easy to explain the bewildering number of "stages" for the supposedly cultivated Hansen bacillus of the writers above-mentioned.

I have attempted the cultivation of the Hansen bacillus from 29 cases of leprosy, and have succeeded in isolating an acid-fast bacillus from 22 of these cases. The chromogenic variety (Clegg) was recovered from 14 of these cases, while 8 yielded a non-chromogenic acid-fast bacillus, which thus far has refused to produce pigment or multiply on the ordinary laboratory media.

For many generations the subplants, both of the chromogenic and of the non-pigment producing forms, have each remained well within the variations of a species and have in general maintained pretty closely the morphology of the Hansen bacillus, as we know it, in the tissues.

In the 14 cases above-mentioned the acid-fast culture recovered eventually underwent a marked change in morphological and cultural features, after which it could be propagated upon the ordinary laboratory media. These cultures, which become chromogenic, correspond to Clegg's description of his original 7 isolations.

In the 8 cases referred to, the non-chromogenic culture, although behaving much as did the Clegg chromogenic bacillus for the first two or three months under artificial growth conditions, has refused to alter in a similar manner.

Since the chromogenic culture behaved much in the same manner during the first three or four months under artificial cultivation, I have looked for a similar change to occur eventually for this "slow-growing" strain. It would seem, however, that it will not do so, as the period of parasitism experienced by the cultures which subsequently became chromogenic and vegetative has long passed. The oldest culture of this slow-growing, non-chromogenic bacillus has now been under cultivation for more than a year, but has only attracted special attention the past nine months, because it is now more than fifty generations removed from the parent stem and still refuses to alter.

The initial multiplication of both the acid-fast strains referred to is accomplished with comparative ease, provided that the bits of leprous tissue transferred are treated in such a way that the protein moiety is split into its dissociate products.

This action upon the protein of the removed leprous

lesions may be accomplished in the following ways: (1) By seeding the tissue transplants with some one of the putrefactive bacteria or with any species capable of hydrolyzing the tissues; (2) by saturating the removed tissue bits with a 1 per cent. trypsinized albumen solution; (3) by transferring the leprous material directly to a medium containing the products of protein digestion.

With any of these methods the acid-fast bacilli in the removed lesions will multiply and continue to do so as long as these products are present, which, of course, is permanently in the case of the medium last mentioned.

To determine if possible whether gross or microscopic differences exist for the experimental lesion induced by the varieties of acid-fast bacilli which have been isolated and cultivated from the human leprous lesion, or whether the experimental lesions induced with any strain is similar to the human lesion or to those produced by the well-known saprophytic acid-fast species, rabbits, guinea-pigs, and rats were injected with graduated doses of the following cultures—namely, five chromogenic leprosy cultures (Clegg, Duval, Brinkerhoff, Currie, Bayon respectively), the non-chromogenic slow-growing lepra culture (Duval), and two representative saprophytic species (Moeller's grass bacillus and the bacillus of timothy hay).

In general it may be stated that macroscopically the lesions produced in these animals do not differ greatly for any of the species employed, unless it be that the chromogenic culture produces lesions which appear earlier and are more localized. The lung usually shows the most extensive changes in the form of greyish-white discrete foci, which are indistinguishable from miliary tubercles, except possibly by the absence of necrosis. Microscopically the cell picture, or relation of the bacilli with respect to the cells, is not sufficiently distinctive of any culture to warrant more than a tentative differentiation.

In other words, the experimental lesion in these animals affords no absolute differentiation for any strain or species of acid-fast organism, excluding, of course, the tubercle family. Lesions are as readily induced experimentally with some of the well known saprophytic species as they are induced with either the infested leprous tissue or with the lepra culture.

To determine, if possible, a relationship between the acid-fast chromogen, the non-chromogenic acid-fast and the saprophytic chromogenic species, a series of rabbits were immunized with the respective cultures and a comparative study carried out upon the immune serums for the detection of specific antibodies. Realizing the difficulty of immunizing against the acid-fast group, the animals were subjected to a long period of treatment, administering large doses intravenously at weekly intervals over a period of three months.

In addition the blood from a series of twenty cases of leprosy was also tested for specific antibodies, to determine if possible a specificity for any given culture isolated from the same case or from other cases of leprosy. In performing these serum tests the agglutination reaction and complement binding tests, using a culture of antigen, were employed.

The serological tests with the blood of lepers has not established an etiological rôle for any type of acid-fast organism recovered from the leprous lesion. The agglutination reaction with the lepers' blood rarely gives a positive reaction in dilution of 1 in 50 with the separated Hansen bacilli obtained from the human nodule, while in the majority of cases a reaction is not obtained above a dilution of 1 in 10. On the other hand, many of the tubercle family and the acid-fast saprophytes react equally as well and not infrequently in higher dilutions. The Wassermann reaction with culture antigen utterly fails to show anything specific for the various cultures in so far as the human serum is concerned.

However, the serum reaction of animals immunized against the various acid-fast species has served to separate into three distinct groups the Clegg chromogenic culture of leprosy (Group I), the Duval non-chromogenic culture of leprosy (Group II), and the chromogenic saprophytic acid-fast species (Group III). The reactions with specific immune serums establish the fact that there is a difference between the non-chromogenic and the chromogenic leprosy cultures. Furthermore, the serum reaction indicates no relation between these two strains and no relation of either to any known saprophytic species. It is hard to explain the occurrence in leprous lesions of this chromogenic acid-fast (Clegg), which, in my experience with cases in Louisiana, is encountered more frequently than the non-chromogenic variety. This may possibly be explained by our present imperfect methods of cultivation. Curiously enough, the chromogenic type, if we are to regard it as an extraneous organism, is always the same variety—that is, a moist, rapidly growing pleomorphic bacillus when once it becomes accustomed to an artificial environment. I have compared the original cultures of Clegg with those isolated independently in other parts of the world, and find them, except for inconstant differences, identical. That this chromogenic strain can be recovered from the lesions of certain types of leprosy there can be no doubt, and that, too, in the lesions where the overlying skin is apparently intact as well as from the internal organs at autopsy.

It is interesting to note that the Clegg leprosy strain undergoes at times the most marked change in tinctorial and morphological features. It is relatively easy to obtain from this culture a non-acid-fast diphtheroid, non-acid-fast streptothrix and a diplococcoid acid-fast type. This wide variation in morphology and difference in staining reaction might possibly account for the non-acid-fast diphtheroid and streptothrical "stages" described by European authors.

In the entire series of cases from which I have attempted the cultivation of the Hansen bacillus I have failed to note the non-acid-fast diphtheroid stage for the Hansen bacillus which has been described by Babes, Bordoni-Uffreduzzi, Kedrowsky, and others, except in so far as the transitory changes in the Clegg culture above mentioned may be thus interpreted.

So far as the non-chromogenic, slow-growing bacillus is concerned, I believe it deserves careful attention. In cultures it is always acid-fast, and usually occurs as long beaded rods.

The presence of the chromogenic Clegg bacillus in the tissues of human lepers, together with the fact that disseminated lesions may be induced that are histologically like human leprosy, led me in a former publication to conclude that the chromogenic strain played an etiological rôle in the disease. In going back over some of the preparations from the animals employed I find them to contain the long beaded acid-fast rods in dense masses, and also many more scattered bacilli which are shorter and less beaded (Clegg bacillus). These findings were described previously by me as indicating a transformation of the long, slender beaded rods to diplococcoid forms, but by replating on a special medium I find that the culture is in reality mixed, containing both strains, so that it is impossible to say without further work just what part the two types played in the production of lesions in the monkey. This view has been greatly strengthened by recent results obtained by replating upon special medium the culture from the original triptophane fish agar formerly described by me. I find that in this culture the two varieties exist; therefore it is not improbable that the subplants of the earlier isolations upon amino-acid medium would also yield both types.

SUMMARY AND CONCLUSIONS.

There may be cultivated from the leprous lesion two types of acid-fast bacilli which have distinct characteristics: one an organism which after it has become accustomed to a saprophytic existence produces pigment and becomes extremely pleomorphic; the other a bacillus growing slowly and only upon special media, retaining its tinctorial and morphological character throughout the period in which it has been under observation (two years).

The strain which subsequently becomes a rapid grower and chromogenic shows a wide variation in morphology and in its ability to retain the stain when subjected to decolorizing agents. At times and under certain conditions the individual bacilli are diptheroid, streptothrical, and non-acid-fast. The slow-growing non-chromogenic culture is always acid-fast, and can be sharply differentiated from the chromogenic culture by its growth features.

The animal experiments undertaken for the purpose of differentiating the acid-fast organisms recovered from the human leprous lesion, and to fix their etiological status are not regarded as conclusive. The serological tests, especially those performed with highly immune serums, are

of some value, and suggest that the leprosy bacillus of Clegg is not closely related to the saprophytic acid-fast chromogens, and that the non-chromogenic slow-growing culture from leprosy is different both from Clegg's isolation and from all known species of acid-fast bacilli.

The role played by the chromogenic bacillus of Clegg in the production of leprosy is as yet an unsettled question.

The non-chromogenic strain, while behaving according to most of our notions regarding a pathogenic organism, has likewise not up to the present been proven to be the cause of leprosy, although I am impressed with the probability of such a rôle being eventually attributed to it, and consider that it deserves more serious attention than any strain so far cultivated from the human leprous lesion.

The wide variation in morphology and staining reaction for certain cultures recovered from the human leprous lesion which subsequently become rapid growers and chromogenic, might ac ount for the views of Kedrowsky, Rost, Williams, Bayon, and others, that *B. leprae* is a bacterium of such pleomorphism that it can be recognized as a non-acid fast diphtheroid, or streptothrix, and as an acid-fast bacillus.

II.—Dr. M. E. Marchoux,
Paris.

THE PROBLEM OF LEPROSY.

Are we in Europe threatened by an active recrudescence of leprosy? He would be a daring person who would venture to assert this. The relations between home countries and their colonies where leprosy exists are always growing more and more intimate. Increasing numbers of different nationalities carry it back into their own countries. Large numbers of foreigners—rich, or also sometimes very poor—some of whom are infective, visit our capitals and take up their residence in them. These are all causes of diffusion of an infectious malady which, in the Middle Ages, was only caused to disappear with very great trouble. We are less well equipped now than they were in those days to fight against it. Compulsory segregation of the diseased would no longer at the present day be accepted, nor acceptable. Science has not hitherto given us any new and humane prophylactic. The obscurity which surrounds the etiology of leprosy has not yet been dissipated. The reason of that is that laboratory animals are not susceptible to infection by the bacillus of Hansen, of which man possesses the sad privilege of being the only host.

In the hope of elucidating certain of the problems which this question raises, I have for several years, alone and with my collaborator, M. Sorel, given great attention to the study of a disease of the rat which presents a remarkable resemblance to leprosy. This disease, discovered at Odessa by Stefansky, has been met with throughout the world. Like leprosy, it is caused by a bacillus, acid and alcohol resistant, which is, up to now, apparently not culturable *in vitro*. Like the bacillus of Hansen, this germ multiplies in the rat with great abundance, remains intracellular, and does not appear to be toxic for the migratory cells which harbour it. It causes formation of nodules, intracutaneous and subcutaneous, glandular and intramuscular. The compression exercised by these tumours brings on atrophy of the hair follicles with production of patches of alopecia, of the epidermal cells with the formation of ulcers where the bacilli swarm, of the muscular cells with the appearance of resultant functional weakness. Although the bacillus of Stefansky, like that of Hansen, lives chiefly under the skin and in the connective tissue, it is also met with in the lungs and the other viscera, in the nervous system, and in the bones. As in the case of the bacillus of leprosy, its rapid multiplication does not cause death, and animals succumb to a secondary infection.

These two bacilli, which have so many points in common, and which cause two diseases so similar, are different, but they appear to form two varieties of the same species as closely related the one to the other as may be human and avian tubercle. It does not seem, then, illusory to try by the study of one of them to attain a more profound knowledge of the other. The bacillus of Stefansky (*Mycobacterium leprae murium*) is not resistant to desiccation, and is killed by heating to 60° for more than five minutes. It is inoculable into the grey rats and white rats of the laboratory, which prove themselves at least equally susceptible—a fact which George Dean has recognised for a long time. But what one did not know was the facility with which this inoculation can be made; it suffices in order that they may penetrate into the organism to place the bacilli of scarification on the epidermis, or even simply on the skin newly shaved.

One can reproduce experimentally the two forms of the spontaneous disease. The first, limited to the superficial glands, which is the most common variety in the case of the sewer rat (*Mus norvegicus*), is that which one produces in the greater number of cases. The second (musculocutaneous), which is clinically similar to human leprosy, is rare in nature. One can produce it by impure inoculations. It seems due to the simultaneous action of the bacillus of Stefansky, and of certain infective organisms of a secondary nature which favour its diffusion. The fact is that in leprous rats this secondary infection is constantly met with. Insects, and other arthropod parasites, never appear to play any rôle in the transmission of the disease. In fact, bites are the usual ports of entry for germs, as the appearance of little nodules upon recent wounds show. The infection of the bites is easily accounted for by the intimate contact in which rats ordinarily live.

Perhaps, in the case of man, infection by contact is as easy as in the case of the rat, but one does not recognize it because nothing betrays it. Perhaps there are many carriers of the bacillus of Hansen without obvious signs of leprosy. The germs might remain localized in one part of the organism, probably in one or several glands, and might not leave them to become generalized in certain individuals, except in the presence of a secondary infection or bodily decay. In other words, there might be more lepers than one thinks, but in the majority the disease might not be revealed except at the autopsy. Thus might be explained the curious statistical observation of Sand, who is astonished to see that only 10 per cent. of children born of mothers who are lepers become themselves leprous. This might be explained by the long incubation periods and the persistence of the infection in a single family. These are only hypotheses suggested by the study of the disease of the rat, but they appear to me to merit the attention of leprologists who live in countries where leprosy exists.

III.—H. Bayon, M.D.,
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A COMPARATIVE EXPERIMENTAL STUDY OF THE LEPROSY CULTURES OF CLEGG, DUVAL, KEDROWSKY, ROST, AND WILLIAMS.

Before proceeding to explain the specimens being demonstrated I am glad to be able to state that the work carried out during the past twelve months only enables me to confirm and amplify the conclusions of my preliminary communication to this section last year.

The only point I have to modify is that which regards the sporadic cases of leprosy in persons who had never left this country. On careful investigation it was found that in one case where the patient denied having been abroad the statement was untruthful. In another case the father and mother and also the grandmother on the maternal side had been lepers, and the boy who contracted leprosy had lived with them when their disease was already in an advanced stage. It was, therefore, not possible to prove an infection through rats in these cases, though I still consider the transmission of infection from rat to man as theoretically possible.

I should like to make a special point of the fact, if I may, that this is above all a demonstration, and that the paper I am reading is mainly explanatory.

I have endeavoured to substantiate all the statements made in this communication by microscopical sections, the number of which has only been limited by the microscopes at my disposal.

The conclusions I have now arrived at, over and above those set forth in my previous paper, are the following:

1. Histological, serological, and clinical evidence lead us to believe that the organism of leprosy is a slowly

multiplying, very slightly toxic bacterium, closely allied to the so-called "tubercle" group, but in so far distinguishable from it by not being artificially cultivable as an acid-fast rod on the ordinary media which are made use of to isolate the tubercle "bacillus," and, moreover, in not being pathogenic for guinea-pigs to the extent that human, bovine or avian tubercle are.

2. Rapidly growing, more or less acid-proof saprophytes are ubiquitous, so that even the repeated cultivation of such from cases of leprosy by no means proves their relationship to the disease in man. Much further identification is required in order to ascertain their true significance.

3. With the exception of Kedrowsky's, no leprosy culture has been, so far, sufficiently identified to enable the statement to be made that its properties and appearance are identical with those of the morphological entity called Hansen's "bacillus," because only Kedrowsky's and the author's cultures have produced lesions in animals absolutely identical with those found in leprosy of the human being and rats.

4. The author's cultural and animal experiments lead him to believe that Kedrowsky's culture is true leprosy, and that Kedrowsky's views of the varying morphology and staining properties of this organism in artificial cultures are correct.

5. Other cultures appear to belong to the group of acid-proof, chromogenic, rapidly growing saprophytes, such as have been found in butter, milk, grass, smegma, urine, dung, earth, etc. Their relationship to leprosy is not clear.

6. Generalized leprous lesions—that is, metastasis in the internal organs—have been produced in rats by the intratesticular injection of the abdominal glands of a rat which has been injected, also intratesticularly, with the ground-up nodules of a leper.

7. A culture from a case of rat lepra has been so far identified as to enable the assertion to be made that it is a pure culture of the organism causing the disease in rats. This culture appears to the naked eye, in its microscopical morphology and staining reactions, very similar to the strain isolated from a leper.

The histological evidence that leprosy does not only attack the skin, but in advanced cases also causes visceral lesions not at all dissimilar in parts to what is seen in tuberculosis, is a fact well known to those who have had occasion to carry out a sufficient number of autopsies of lepers. A review of the subject has been given by Schaffer and also Kedrowsky, who have shown that under certain circumstances giant cells very similar to those of the Langhans type may occur in lepromata, and that sometimes the resemblance between a leprous affection and tuberculous disease can be so complete that only experiments with guinea-pigs enable the distinction to be made.

Lepers are known to react with tuberculin in a similar fashion to tuberculous patients. For further information on the subject I can but refer to the work of Brinckerhoff and the paper of Babes in *Lepra*, 1910, p. 322. Clinically the disease is similar in many points to tuberculosis because of its long incubation, its slow progress, its intractability by any of the drugs known so far.

The similarity of the morphology and staining properties of Koch's and Hansen's "bacillus" is too well known to require repetition. All these observations lead us to believe that the culture of leprosy, or, more exactly, of Hansen's "bacillus," must belong to the so-called "tubercle" group.

If we consider how "leprous" lesions can be imitated under certain circumstances by avian tubercle when injected into fowls and guinea pigs, we may expect the culture to be similar to avian tubercle. Such microscopical specimens have been published in the last report of the Tuberculosis Commission.

In any case, as said before, it clearly belongs to the "tubercle" group, which consists of human, bovine, and avian tuberculosis.

Quite a different group of organisms altogether, especially as far as their cultural characteristics and pathogenicity for animals are concerned, is formed by the extremely ubiquitous more or less acid-proof saprophytic bacteria, which are exemplified by the *B. smegmae*, *B. phlei*, the numerous acid-fast rods isolated from butter, milk, grass, nasal discharge, urine, dung, earth, etc., by Rabinowitsch, Lombardo-Pellegrino, Binot, Nabarro, Korn, Grassberger, Marpmann, Moeller, Karlinski, Kersten, and others. To the same group belong no doubt the acid-fast bacteria to be found in tap water, and which I have found to possess definite acid-resisting filamentary branching forms, which break up into acid-fast rods. This organism appears to be the one observed by Brem, Beitzke, Schern, and Dold.

The outstanding feature of this latter group is the capacity for growing easily at room temperature on any of the usual laboratory media such as common agar-agar or gelatine. They are non-pathogenic for guinea-pigs in small doses or if injected alone. If injected intraperitoneally in sufficient quantity into guinea-pigs together with butter or fat they are capable of producing nodules on the peritoneal surface not at all dissimilar to what can be seen after injection of human tubercle, and at times the distinction may present difficulties. If injected intravenously in great quantity they may produce caseating nodules in various internal organs, which under certain circumstances may contain an enormous quantity of acid-fast rods, which possibly are only deposits of the organisms injected.

These organisms are generally easily regained in pure culture from the animals into which they have been injected, but though the growth can be very slow for the first generations, gradually it gets more and more rapid till practically all can be made to show a definite growth after three days, on common agar at 37°. Even a fortnight may elapse before the first colonies appear.

The bacteria of this group frequently produce a brilliant yellow or red pigment of varying intensity according to the media they are grown on. Some are almost constantly milky white, such as *B. smegmae*, Karlinski's "nose-bacillus," Moeller's "grass bacillus," A dry, white growth such as Marpmann's acid-fast organism from urine may turn moist yellow and at other times take on a reddish hue, so that it is difficult to make use of pigmentation or similar features as a means of distinguishing one growth from another.

The whole group, therefore, can be roughly differentiated from the family of "tubercle bacilli" of warm blooded animals, from which we must except Hansen's bacillus, by its not being pathogenic for guinea-pigs in small quantities and in growing easily at room temperature on gelatine.

Having approached the problem of leprosy as an investigator with the definite purpose of comparing the claims of different cultures which had lately been published by various authors, I soon found it necessary to compare the behaviour of this large group of acid-fast organisms with that of human, bovine, and avian tubercle cultures from various sources, any leprosy cultures I succeeded in getting being only considered from the standpoint of confirmatory evidence. Once it had been settled which of the many cultures was really Hansen's "bacillus," I could then proceed to identify my strain. This work has been extremely slow in progressing, and I must acknowledge with gratitude the help that has unstintingly been given me by the Lister Institute and staff, and also by my co-worker, Dr. J. M. Martinez of Santamaria Bogota.

The long incubation of directly inoculated leprosy enables me to demonstrate only the second generation of directly transmitted leprosy in rats. The third generation is still under observation, and I do not wish to kill the rat till several months have elapsed.

The following lepra cultures have been extensively tested on animals experimentally: Kedrowsky's strain from Moscow, Duval's culture from New Orleans, Rost's Indian strain, the author's culture from rat leprosy. I have also Clegg's culture, but unluckily was unable to procure Williams's strain, which, however, is considered to be identical to Rost's culture, and appears to belong to the same group of rapid-growing organisms. From personal communication of the author and from Captain Williams's papers on the subject, I see, however, that it is practically non-pathogenic for animals, and admittedly has so far produced no "leprous" lesions in the animals injected with it.

These cultures have now been injected into monkeys, rabbits, guinea-pigs, rats, mice, fowls, and pigeons. The animals were killed at times varying from twenty-four hours to seven months. In no animal, with the exception of a certain proportion of those that had been injected with Kedrowsky's culture and with the culture from human and rat leprosy, were lesions produced which could

fairly be considered similar to those occurring in human or rat lepra. The lesions produced by Duval's and Rost's strain would successfully be imitated by intravenous injection into rabbits, or intraperitoneal injection into rats, of large quantities of saprophytic organisms such as Moeller's dung "bacillus" or Grassberger's acid-fast from milk.

This is certainly an apparently sweeping statement; the proofs of my assertion are, however, under the microscopes. You will see that, whether you inject Kedrowsky's culture, the culture I have isolated from a leper in London, the ground-up leprous nodules from human beings or rats, or the organism isolated from rat lepra, you find the same outstanding features in the resulting lesions—an overwhelming quantity of acid-fast rods, to the extent that the whole field of vision may appear to be one mass of acid-fast ruby-red "bacilli," together with a minimal reactive tissue proliferation, hardly any giant cells similar to the true Langhans type as seen in tuberculous lesions, no caseation necrosis, or sclerosis of the vessels.

These are the typical features of the "leprous lesion," and as such they are described by MacLeod in his "Survey on the Present State of our Knowledge of the Bacteriology and Pathological Anatomy of Leprosy," *Lepra*, 1910, iii, 309.

What are the changes brought about by the injection of Duval's strain into animals? Extensive necrosis, production of giant cells of the Langhans type with a necrotic centre, scarcely any acid-fast rods to be detected—in a few words, all the histological features that can be produced by acid-fast saprophytic germs of the timothy grass group. At no time is Duval's organism identical in morphology with Hansen's "bacillus," though at times it resembles it to a certain extent.

Rost's germ is practically non-pathogenic for animals. To produce lesions you must repeatedly inject big quantities or several culture slopes at a time. The resulting lesions show very few acid-fast rods, not at all morphologically similar to Hansen's "bacillus," some caseation, and a copious round-cell infiltration.

Serologically—that is, by means of complement absorption or by agglutination—both these germs react with leprous serums in the same dilutions as the majority of the saprophytic acid-fast and acid-resistin g bacteria.

Rost's germ has not been often cultivated, but it still remains to be explained how Duval succeeded in getting, time after time, from the internal organs of his cases an organism that is clearly only distantly related to leprosy and certainly unable to produce any leprous lesions in animals; at least, in the sections kindly sent me by Duval leprous lesions could not be recognized by authorities on the subject such as Dr. MacLeod in London, Professor Jadassohn of Bern, Professor Marchoux in Paris.

Regarding the differentiation of acid-fast organisms by means of various serological methods, such as agglutination, precipitation, and complement absorption, it is known that Duval considers it impossible to carry out these experiments satisfactorily with the serum of lepers. It is quite true that the serum of many lepers reacts very feebly indeed with any acid-fast organism, including the cultures I believe to be genuine leprosy. It so happened that the serum I tested first was the most efficient from this standpoint; none of the others that I examined later showed such marked reactions. But even here, though the titre in relation to Kedrowsky's strain may have been low it was absolutely negative in relation to Duval and Rost's strains. I have published the results of some of my complement absorption experiments, and can but repeat that my results confirm on the whole those of Much and his co-workers, and do not in any way agree with Duval's agglutination tests, so that in this case, whilst awaiting confirmation from an independent source, I have resolved to repeat my experiments on a bigger scale with a great number of leper serums. This I have not been able to do so far.

I can only state once more that by gradually diluting in constant proportions the serum and antigen, moreover by suitably preparing and titrating the antigens, one can, as is to be expected, differentiate with appropriate serums leprosy from tubercle, but not Duval's or Rost's strain from Moeller's dung "bacillus" or Grassberger's organism from milk.

It may also be noted that Dr. Ledingham, of the Lister Institute, has carried out several tropin content determinations with leper serums linked against Duval's and Kedrowsky's strain of leprosy. Duval's strain was not taken up specifically by the leucocytes employed in the presence of inactivated leper serum, whilst on several occasions a very high tropin content could be shown to exist in the serum of certain cases of leprosy when tested against Kedrowsky's culture.

I have no difficulty in admitting that these experiments require repetition on a larger scale; but in the meanwhile it remains an undeniable fact that leprous lesions have been produced in rats and mice by injection of cultures regained from men and rats affected with lepra, as the specimens shown clearly demonstrate. Moreover, that so far no lesions similar to those occurring in human beings have been produced either by Rost's or Duval's culture, so that definite and conclusive serological or experimental proof must be awaited before considering them as cultures of Hansen's "bacillus."

Turning now to the question of the communicability of leprosy to animals, I have been able to persuade myself that it is possible to transmit the disease directly to rats from the human being by injecting ground-up lepromata into the testes. The incubation is exceedingly long and in many cases the lesions are only localized. Since publishing my last paper on the subject in the BRITISH MEDICAL JOURNAL of February 24th, 1912, I have been able to produce in the second generation definite leprous lesions in the spleen, liver, and lymphatic glands of the rat injected, as you will see in the specimens placed under the microscope for your inspection.

In the first instance the localized lesions took four months to develop; the second rat, injected with a lymphatic gland from the first animal, was killed six months after inoculation, and showed great numbers of acid-fast rods in the viscera, which I am now demonstrating. I have no doubt that a multiplication of the "bacilli," though doubtful in the first instance, did take place in the second generation. Culture attempts were unsuccessful.

In a demonstration held before the Society of Tropical Medicine and Hygiene on February 15th, 1912, I announced with Dr. Martinez the culture of an acid-fast rod from a case of rat leprosy. At the time I was not able to give a description of the fish-juice agar used in the isolation of the organism, owing to the short time at my disposal. I do so now, remarking, however, that though I consider the medium to be quite good for the isolation and culture of most acid-fast organisms, still I do not believe that it can enable us to guarantee a culture in all cases of rat leprosy. The culture on artificial media is a result depending on some factor connected with a special stage or condition in the developmental cycle of the filamentary, branching organism, which I consider to be the parent form of the "bacillus" of rat leprosy, as I also consider a filamentary, branching, non-acid-fast organism to be the parent form of Hansen's "bacillus."

The fish-juice-agar is prepared in the following fashion: Mackerel, cod, or bream are carefully cut up in a meat-chopper and mixed with an equal quantity of sterile distilled water. This mash is placed to freeze hard in the refrigerating room, and next day rapidly thawed. The liquid is separated from the solid matter by first straining it through a thick cloth, after which it is further cleared by passing through a paper filter, vacuum being used to hasten the process. A Berkefeld and a Doulton filter are linked up tandem fashion, and the resulting liquid is caught in a sterile flask, kept twenty-fours at 37° to detect any contamination, and filled into test tubes with an equal quantity of 4 per cent. glycerine agar, which has been liquefied and then allowed to cool down to 42–45° C. Contamination must be carefully avoided, as the slopes may not be sterilized or heated after mixing. It is necessary to go quickly through all stages of filtration after thawing, as decomposition is very rapid.

The rat leprosy nodules are thickly smeared over a good number of tubes; I have often used as many as fifty at a time.

Though our rat leprosy culture has now been artificially cultivated for months, it still has not adapted itself to artificial conditions of life so as to grow in a shorter space

than two or three weeks at the very least, showing, therefore, that it does not belong to the "saprophytic" group. It only thrives so far on the media that grow tubercle, and shows no growth at room temperature or on gelatine. As you see, it is also a milky-white, absolutely non-pigmented moist growth, very similar to avian tubercle, but non-pathogenic for fowls even in big doses, half a slope or more.

To produce lesions in a guinea-pig one has to inject a slope or more; in small quantities, up to ten loopfuls, it appears to be non-pathogenic. Injected into rats it has caused so far the identical glandular and visceral lesions which are caused by the intraperitoneal injection of ground-up nodules of spontaneous rat leprosy. These slides show that the organism has been identified, and I am now proceeding in my attempts to regain this bacterium from the animals infected—an experiment which has not succeeded so far.

Also in this point the similarity with human leprosy is striking,* so that I still hold that the rat disease and the human disease, if not identical, are as closely allied as human and bovine tuberculosis are.

A point in connexion with human and rat leprosy which I have not investigated during the past year is the question of an eventual transmission of the disease through arthropods. So little is known about the bionomics of Hansen's "bacillus" and the "bacillus" of lepra murium, that it is premature, to say the very least, to decide whether the presence of a few acid-fast rods in any arthropod, be it a bug, mosquito, fly, flea, or louse, has any connexion in the spread of leprosy, especially as we do not know, nor have means of proving, whether the acid-fast organism seen under the microscope is really Hansen's "bacillus" or a simple ubiquitous saprophyte, moreover whether it is dead or alive, and capable of multiplying and infecting. It is quite possible that the non-acid-fast stages of the germ of leprosy are the only ones capable of infecting in small numbers.

Regarding treatment I am awaiting the results of the injections with bacterial extract, made on the same lines as Koch's old tuberculin from one of Kedrowsky's cultures. This substance gives a definite, typical rise of temperature within twenty-four hours in the three nodular cases I have injected with 1 c.cm. of the extract. I do not know if it has any therapeutic value; in any case I do not expect it to produce any conclusive results till many years have passed, during which the patients have been under close observation. I believe that we cannot hope for any cure under the time that the disease has taken to develop, which in the majority of cases is a period extending over many years.

To show that I am quite aware of the pitfalls attending therapeutic efforts in connexion with leprosy, I am projecting a series of photographs which I owe to the kindness of Dr. George Turner, showing the remarkable improvement which took place in a young girl leper who had not undergone any treatment whatever during this time. Later on the disease again took a progressive course.

The acid-fast rods found in leprous lesions are so quiescent in the tissues, moreover resist disintegration through the protective substances of the animal body and tissue reactions, that I am unable to expect much from what is called "vaccine" (killed cultures) treatment.

My conclusions are, in a few words, the following:

1. Only Kedrowsky's culture and similar or identical strains, such as Bayon's, have produced on injection leprous lesions in animals.
2. Duval's and Rost's strains do not cause any leprous lesions in animals. Their cultural behaviour is that of saprophytic organisms. The same applies to Clegg's culture.
3. The direct transmission of leprosy from man to rats has succeeded in the second generation.
4. A culture from a case of rat leprosy has produced on injection into rats identical glandular and visceral lesions to those found in the spontaneous disease.
5. A bacterial extract prepared from the culture isolated from lepers gives a specific rise of temperature, but cases have not been observed long enough to enable any conclusions to be drawn as to its therapeutic value.

* Of course this is not the only reason; I have given the others in previous papers.

DISCUSSION.

Professor GEORGE DEAN (Aberdeen) remarked that the present state of affairs in regard to cultures derived from cases of leprosy was unsatisfactory, there being a large number of workers, each of whom appeared to think that his, and his organism only, was the true cause of leprosy. The investigation of the subject from the side of rat leprosy might prove of value. The lesions of the spleen and other viscera which Bayon had shown, produced by the injection of his pure culture from rat leprosy, were identical with those which he (Dr. Dean) obtained by injection of material from spontaneous leprosy of the rat, and had all the histological characters of human leprosy. After seeing Bayon's serological tests, it was difficult to accept Duval's chromogenic organism as the cause of leprosy. The free growth on ordinary media at low temperature, and its morphology, did not suggest to him that it was the leprosy bacillus. No dogmatic position, however, should be adopted till much more work was done on the subject. A free interchange of cultures by different workers was highly desirable at the present stage of the subject. Though the subject had been to many a very disappointing one, the present time seemed very hopeful, from the large number of workers in the field and the widespread interest in the subject.

Dr. E. P. MINETT (British Guiana) said that in British Guiana laboratories their cultures always contained acid-fast bacilli and cocci and never streptothrix. The results of injection into rats, guinea-pigs, rabbits, and monkeys with Williams's and their own cultures were invariably negative. So far also they had found that treatment with vaccine and with nastin and benzoyl chloride was without result. He confirmed Dr. Bayon's observation as to the self cure of leprosy—the anaesthetic variety—and could show proof of this in 13 cases. He found that bacteriolysis was common in both treated and untreated cases, and no value could be placed on it as an indication of results.

Dr. BAYON, in replying, said: The simple cultivation of an acid-fast organism from cases of leprosy does not prove its relationship to the disease till the culture can produce by injection into animals the leprous lesions found in visceral lepra of man. The slides demonstrated show you that whether you inject Kedrowsky's culture or rat leprosy culture into rats, or make use of ground-up leprous nodules from men or rats, you get in a certain number of cases identical lesions in the spleen, liver, glands, and sometimes lungs of the rats experimented upon. The work is very slow. In ten to eleven months I have only succeeded in getting a second generation of directly transmitted human lepra in rats. You will see the specimens from the spleen and liver of these animals. You will see that the quantity and position of the acid-fast rods, the minimal resulting tissue reaction, are identical to the lesions produced by culture. It has taken two years to get these results, and I do not believe that less than further five or six years will enable us to get an absolutely clear result in the matter.

PAPERS DEALING WITH LEISHMANIASIS.

I.—W. S. PATTON, Captain, I.M.S.,

Madras.

THE KALA-AZAR PROBLEM.

I HAVE been asked by the secretary of this Section to give you a short paper on my work on the etiology of Indian kala-azar. I do not think I could do better than place before you this problem as it stands to-day, and to tell you exactly what I have accomplished. It is now seven years since I began this work, and five years since my last paper was published. I have no doubt that many of you have wondered why further work in connexion with the bug was abandoned, and why, apparently, nothing has been done for five years. Several observers have asked me whether I still seriously believed, in view of the recent Italian work with the flea, that the bed-bug is the transmitter of the parasite. At the outset I need hardly say

that I still firmly believe that the bed-bug, *Cimex rotundatus*, is the transmitter of the parasite of Indian kala-azar.

In 1905 I realized three main points in connexion with the successful investigation of this problem:

1. Thorough mastery of insect technique.
2. That the cultivation of the parasite in the test tube would never lead me to discover in which insect it underwent its development.
3. That the clue to the solution of the kala-azar problem lay in the study of the flagellates of the genus *Herpetomonas*.

1. *Insect Technique.*—By this I mean all the little things which go to make insect feeding experiments under artificial conditions successful. Those of you who have attempted to study the development of any protozoon in its true invertebrate host will agree with me when I say that although in nature the life-processes of such a parasite are carried out with precision, yet when we control the insect and feed it under artificial conditions we fail to study the life-history of the protozoon, and are met with obstacle after obstacle till some little flaw in our technique has been discovered. The mastery of insect technique in this particular work is of fundamental importance.

2. *The Cultivation of the Parasite in vitro.*—In 1905 I studied the development of the parasite in the culture tube in order to observe for myself its flagellate stage; since then I have never cultivated it, and as a result my work has been criticized for this apparently serious omission. Permit me, then, to state why I omitted this ready means of studying the parasite. In 1905 I set out to try and find in which blood-sucking insect the parasite underwent its development, and how that insect then transmitted the parasite; since then this, and this alone, has been my goal. I am well aware that the parasite of kala-azar will develop into a flagellate in several kinds of media in test tubes, and that it can be maintained in this condition for long periods. I now ask you how the knowledge, gained by studying the parasite in these culture media, can ever help us to find the natural invertebrate host of the parasite. I would be deeply indebted to those who adopt this method of studying the parasite if they would tell me, as a result of this work, exactly how it gains access to man's body. Yet some observers, even to-day, compare my insect-feeding experiments with their cultures *in vitro*. Dr. Row states that he has discovered the complete development of the parasites of kala-azar and Oriental sore in the test tubes—that is to say, using Dr. Row's nomenclature, the development of the ⊙ body to the flagellate, and from the flagellate back to the ⊙ body; he wonders whether it is possible to transmit the parasite by the aid of the ⊙ body stage, whatever that may be. Granting that Dr. Row is able to accomplish this, are we to-day any nearer the solution of the methods of transmission of these parasites in nature? His discovery, if it is confirmed, only goes to support the view which I brought forward in 1907 (see Annual Report of the King Institute for that year), that these parasites, in order to again pass back to man, must be inoculated in their post-flagellate stages.

3. *The Study of the Flagellates of the Genus Herpetomonas.*—I have all along maintained the view, first advanced by Major Rogers, I.M.S., that the parasite of kala-azar is a true insect herpetomonas, and have believed that the study of these flagellates in other insects would give us the clue to the origin of the human parasite. I therefore abandoned all further work on kala-azar, and made an exhaustive study of several herpetomonads. For details of this work I would refer you to my papers, especially to one on *Herpetomonas muscae domesticae* in *Musca nebulo*. You will now see that this work has been of the utmost value in the elucidation of this problem.

In the first place, I wish you to clearly understand that, as far as I have been able to discover, the parasite of Indian kala-azar will only develop into a flagellate in the bed-bug. I have repeatedly failed to find its development in lice, mosquitos, *Conorrhinus rubrofasciatus*, and, so far, in the dog-flea, *Ctenocephalus felis*. Yet in spite of these facts it is still believed, and stated, that my work harmonizes with the recent observations of Dr. Wenyon on the parasite of Bagdad boil in *Stegomyia fasciata*, and those of Professor Franchini on the parasite of Italian kala-azar in *Anopheles maculipennis*. Further, if the development in the bed-bug is due to the fact that this insect contains a rich haemoglobin-containing medium, why, may I ask, does it fail to develop in other insects, and particularly in *Conorrhinus rubrofasciatus*, which contains, when fed on human blood, an enormous amount of rich pabulum? I would most emphatically state that the alimentary tracts of these blood-sucking insects are not test tubes containing pabulum rich in blood, but they are organs in which complicated processes of digestion take place. Any one who has experimented with lice will know that the process of digestion in them is totally different from that taking place in the bug or the mosquito. As a result of my work on insect herpetomonads I believe that, with one or two exceptions, each species will only live and develop in its particular insect. I am unable here to enter into details of cross infection experiments with bred insects infected in the laboratory. I can only ask you to accept this conclusion: "*Cimex rotundatus*, then, is the specific invertebrate host of the parasite of Indian kala-azar."

The next point I wish to bring forward is that the food of an insect has a direct bearing on the life-history of its herpetomonas (Cf. my paper on *Herpetomonas muscae domesticae.*) It was found that the natural herpetomonas of *Culex fatigans*, though present in almost every male mosquito, was only rarely found in the female. On investigating this point further, it was discovered that when an infected female took its first feed of blood, and if the parasites were present as flagellates in its stomach, they were almost invariably destroyed. I took advantage of this fact in my recent feeding experiments with bred *Cimex rotundatus* and *Cimex lectularius* on a case of kala-azar in whose peripheral blood there were hundreds of parasites, and as a result the following important discovery was made: When the parasites had flagellated in these bugs, and the latter again fed either on a case of kala-azar or on a monkey (*Macacus sinicus*), the flagellates degenerated and disappeared within twelve hours, whereas in those bugs which had only fed once on the case the flagellates went on multiplying, and every bug contained large numbers which actively multiplied from the fifth to the eighth day. By the twelfth day they had all practically reached the post-flagellate stage, and were only found in the stomach of the bug. These observations are fully described in a paper which is now in the press. This discovery of the destruction of the flagellates by fresh blood, either of man or the monkey, is of fundamental importance; for if we are to attempt the transmission of the parasite by the bug, repeated feeding will defeat the end we have in view, as it has already done in my previous work. At present it is useless to attempt the transmission of this parasite through the bug to an animal, for the simple reason that we do not know of a susceptible one.* Dogs and monkeys have so far proved refractory, but these experiments are now being vigorously repeated. Over 400 dogs destroyed in Madras during March and April from the endemic areas have been examined, with negative results; these observations will be continued for a year. The inoculation of dogs and other animals, under the most rigorous conditions, will, I hope, soon settle the question as to whether the parasite can be transmitted to any known animal. As soon as this is settled transmission experiments through the bug will be carried out. Till then I need only say that no one realizes more than I do the great gap at present existing between my observations on the development of the parasite in the bug and the conclusive proof that it is the natural carrier. I would therefore ask those who are anxiously awaiting this proof to exercise still further patience. The elucidation of this problem, I regret to say, has advanced very slowly, but you will bear with me when I say that I am just as anxious as you are to settle this question once and for all. All my plans are laid for the next good case which comes along, and I confidently expect to be able to convince every one that the parasite will only complete its development in *Cimex rotundatus* under the conditions mentioned above.

A few words regarding the recent work on the human and canine kala-azar of the Mediterranean littoral. I have read with the utmost interest Dr. Wenyon's able

* I have succeeded in infecting a white rat by inoculating it intraperitoneally with splenic emulsion.

summary of the work in the first number of the *Kala-azar Bulletin*. On laying it down I regret to say that I am no wiser as to how children contract the infantile form of the parasite, and as to whether the flea or the mosquito is the natural carrier. The feeding experiments which have been carried out are, in my opinion, misleading, for these insects had been fed on cultures of the parasite and not on the peripheral blood. They are, therefore, in no way comparable to my experiments, for if you will refer to my papers, you will find that I have invariably traced the parasite from its unchanged condition in a leucocyte in the stomach of the bug through all its stages up to the formation of the mature flagellate. This has yet to be done in the case of the canine and infantile form of the parasite.

II.—R. Row, M.D.Lond., D.Sc.Lond.,
(From F. D. Petit Laboratory, Byculla, Bombay.)

SOME EXPERIMENTAL FACTS *RE* KALA-AZAR (INDIAN).

In a former communication[1] I pointed out that *Leishmania donovani* of Indian kala-azar could be grown in successive cultures both in N.N.N. medium and in a haemoglobinized saline medium[2] described by myself; and that at a certain stage of the culture typical bodies resembling the original parasites could be demonstrated. The experimental results, both with the original virus and the culture, were awaited with interest, and as some of the observations are just completed, I crave permission to submit these at once to the Association. I restrict myself here to the results obtained by infecting the monkey (*Macacus sinicus*) cutaneously and subcutaneously with (1) original virus, (2) an old culture derived from the original virus.

1. The virus was derived from a human source, and was obtained by splenic puncture. It was fairly rich in parasites. It was rubbed into the skin (after scarifying) of the forehead of a monkey in two spots, one on either side, on March 16th. The scarified surface healed completely in four or five days, and nothing was marked until May 22nd (about nine weeks), when a small pinhead nodule was observed on the left side. This felt hard. A small quantity of the fluid squeezed out of this after puncture, when smeared and stained, showed a few parasites typical of the original virus. The culture made from the same unfortunately got contaminated. This nodule has grown during these six weeks; and is now of the size of half a pea. It contains bodies recognizable as the parasites, but not so typical as those observed on May 22nd. The scarified spot on the right side developed two pinhead papules about June 6th. These have also grown slightly but not markedly, and they also contain bodies like those on the left side lesion, though in scanty numbers. This animal* is quite well and thriving. His further progress is being watched with interest to see if he will ever develop a general infection.

2. A fifth subculture in N.N.N. medium (from the original parasite derived from the spleen of the same case as (1) on December 20th, 1911) which was found to be rich in flagellates on January 20th, 1912, but full of rounded forms on February 2nd, was injected subcutaneously into the right and left side of the forehead of Macacus 3, the portion injected on the right side being 0.3 c.cm. and that on the left side 0.15 c.cm. There was no local reaction at the seat of injection, which was unrecognizable even three days after the injection. The animal has been quite well and thriving. There was nothing noticed at the seats of inoculation week after week when observations were taken until July 2nd—that is, five months after the infection—when two nodules were found to have developed, one on each side of the forehead, at the seat of inoculation; the right nodule being distinctly larger than the left one. The nodules are freely movable under the skin; they feel like half-beans under the skin, which is perfectly healthy. They are firm and almost hard. One of these nodules was punctured on July 4th, and the scanty serous juice which was squeezed out, when smeared, fixed and stained showed a fair number of parasites like those found in the spleen, etc., of a kala-azar case. These parasites have reached up till now in culture (twenty-four hours) only the preflagellate stage of development, and I have little doubt by another twenty-four hours they will show flagellates.

The results of the intraperitoneal infection with the virus, as well as with the cultures, both in the monkey and in the other animals, are not yet ready as the observations are yet incomplete.

From the foregoing experimental results the following points and facts come to light:

1. By the cutaneous injection of the virus of kala-azar from a human source it is possible to induce a cutaneous lesion in a susceptible animal—for example, *Macacus sinicus*, the incubation period in this case being about nine weeks.

2. By the subcutaneous injection of a three weeks old culture of *Leishmania donovani* in N.N.N. medium it is possible to induce a subcutaneous lesion in a susceptible animal—for example, *Macacus sinicus*, the incubation period in this case being about five months.

3. Parasites resembling those found in the human tissues are found in fair abundance in these lesions artificially induced cutaneously and subcutaneously—these parasites being also culturable into flagellates in suitable media.

4. It is not possible at present to say how far these lesions will affect the animal—that is, whether these will ultimately get absorbed without causing a general infection or whether they will ultimately lead to a general invasion by the parasite—although, from the localized nature of the nodules, their free mobility, and the general good condition of the animals, it looks as though they are going to be only local.

5. The bearing of these lesions on the possible results of a cutaneous infection by biting insects, who might act as transmitters, is interesting.

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III.—H. B. Fantham, D.Sc., B.A.,
School of Tropical Medicine, Liverpool.

SOME INSECT FLAGELLATES AND THE PROBLEM OF THE TRANSMISSION OF LEISHMANIA.

Having paid conside able attention to the study of insect flagellates, I venture to bring to notice certain of the protozoal organisms which may occur in the alimentary tracts of blood-sucking insects, such as fleas, lice, and mosquitos, all of which have been suspected of transmitting various species of *Leishmania*. The occurrence of such insect flagellates complicates the *Leishmania* problem.

Several Italian investigators have laid stress on the transmission of *Leishmania infantum* by fleas, both dog fleas and human fleas. However, it should be remembered that the human flea, *Pulex irritans* (adult and larva), has been shown in England to harbour a flagellate in its digestive tract. This flagellate, *Crithidia pulicis* (Porter, 1911), is a natural parasite of the flea, and passes through a *Leishmania*-like preflagellate stage. *C. pulicis* is not a developmental stage of a trypanosome or of *Leishmania*, for it was found in fleas bred to the third generation on a normal healthy person in England, who did not suffer and has not since sufferred from either trypanosomiasis or leishmaniasis.

Again, in the case of dog-fleas in Turin, Marzocchi (1911) has recorded the occurrence of a flagellate in the alimentary tract of *Ctenocephalus canis*, possibly belonging to the genus *Herpetomonas*, though Marzocchi does not figure or name the parasite. Nöller (1912) recently recorded a flagellate, which he calls a *Leptomonas*, from the digestive tract of the same flea in Germany. He gives a very few sketches of the parasite.

Personally, last autumn I found 3 cases of *Herpetomonas* infection in dog-fleas (*Ctenocephalus canis*) out of 68 dog-fleas examined. The fleas were taken from a healthy dog in England. The dog was quite free from trypanosomes and *Leishmania*. The flagellates were not numerous, the stages seen being rounded (*Leishmania*-like) and elongate oval, uniflagellate parasites. I believe that the parasite is a *Herpetomonas*, but have not yet quite obtained its complete life cycle. I had previously seen rounded forms of the parasites in dog-fleas in Cambridge in 1908. The parasite may be named provisionally *Herpetomonas ctenocephali*. Patton has recorded the occurrence of a *Herpetomonas* in the flea, *Ctenocephalus felis*.

Basile, in his transmission experiments of *Leishmania* from dog to dog by means of fleas, has not entirely precluded the possibility of his having mistaken forms of *Herpetomonas ctenocephali* for *Leishmania*.

Human lice, both body and head varieties, have been suspected of transmitting *Leishmania*. Recently I published a paper on a flagellate, *Herpetomonas pediculi*,

* This animal was exhibited at the meeting of the Bombay Branch of the British Medical Association on June 29th, when the lesions were demonstrated.

occurring in the digestive tract of human body lice (*Pediculus vestimenti*) in England. Many of the lice were bred on my own person, and fed on my blood, and some of these bred lice were found to be infected. The organism passes through pre-flagellate, flagellate, and post-flagellate stages. The pre-flagellate stage is like *Leishmania*. The flagellate is a natural parasite of the louse, and has no connexion with either *Leishmania* or *Trypanosoma*. I have still more recently found similar herpetomonads in *Pediculus capitis*. The method of infection is contaminative, that is, by the mouth. Captain Mackie, I.M.S., informs me that he has seen a similar parasite in human lice in India. The occurrence of such a flagellate in lice must be recognized if these insects are used in transmission experiments with *Leishmania*.

Also, herpetomonads are known to occur in the digestive tracts of certain mosquitos. *Herpetomonas culicis* has been described by Novy, Patton, and others from the gut of *Culex pipiens* and *Culex fatigans*, both in the larvae and adults. The flagellates had been seen by Ross in 1898. Allied flagellates, such as *Crithidia fasciculata* (Léger), occur in various species of *Anopheles*. Wenyon (1911) has recorded a *Herpetomonas* in the larvae of *Stegomyia fasciata*. The occurrence of these natural flagellates of mosquitos complicates matters, and they must be considered in experiments on the transmission of various *Leishmania* by mosquitos. Wenyon states that *L. tropica* can develop into the flagellate stage in the gut of *Stegomyia fasciata*, and Franchini states that *L. infantum* can develop into the flagellate stage in *Anopheles maculipennis*.

Wenyon has observed in Aleppo a herpetomonad in the gut of *Phlebotomus*, which has been suspected of transmitting *L. tropica*.

House-flies have also been suspected of spreading *L. tropica*. In their digestive tracts *Herpetomonas muscae domesticae* (Burnett) may occur.

Apparently no natural herpetomonad flagellate has yet been recorded, or at any rate investigated in detail, from the gut of the bed-bug, although a large number of bed-bugs have been examined in various parts of the world.

Other flagellates known to occur in allied insects might be mentioned. Time, however, does not allow of further discussion of them or of the evolutionary significance of these interesting organisms. All the flagellates named pass through *Leishmania*-like stages, which must not be mistaken for *Leishmania* itself, while a flagellate herpetomonad closely resembles the flagellate forms of *Leishmania*. The possible occurrence and intrusion of such natural flagellates of insects in transmission experiments with *Leishmania* and blood-sucking insects must not be overlooked.

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DISCUSSION.

Dr. H. SEIDELIN (Liverpool) stated that he had recently observed in Yucatan (Mexico) several cases of dermal leishmaniasis. From the new world several cases had been reported (Brazil, the Guianas, and Panama), but in the case of Yucatan there were several peculiarities which deserved to be mentioned. They had here to do not with isolated cases, but a condition which was widespread in the interior of that State; in fact, almost all chicleros—that is, collectors of chicle (the raw material for chewing-gum)—were said to suffer from this disease. Furthermore, the affection showed a very peculiar predilection for the ear, being localized in practically all cases on the pinna, and was commonly called the "ear ulcer of the chicleros." The speaker had seen ulcers of the same nature on the forearm and on the legs, but only in individuals who had also ear ulcer. Further, in all cases he had found a mixed infection of *Leishmania tropica* and diplococci, in closed nodules, as well as in the ulcerated ones. (The speaker concluded by demonstrating a number of illustrations in point.)

Professor F. C. MADDEN, F.R.C.S. (Cairo), said: I would like to draw attention to a peculiar condition with which I have been familiar for many years in Egypt, and which, after repeated failures to find any causal parasite, I was accustomed to call papilliferous degeneration of the skin. Fortunately, however, my colleagues Professor Ferguson and Mr. Richards discovered the actual *Leishmania tropica* in certain sores of this nature, and have published their results in detail in the *Annals of Tropical Medicine and Parasitology* of the Liverpool School of Tropical Medicine, vol. iv, No. 2, July, 1910, under the title "Parasitic Granuloma." I will therefore content myself with presenting a few photographs of this condition and showing you a slide prepared by Professor Ferguson with his notes on the parasite. The slide shown was taken from smears of pieces of the outer edge of the sores, stained by Giemsa's method. The following are notes by Professor A. R. FERGUSON on the specimen prepared by him from cases of parasitic granuloma occurring in Egypt: The Leishman bodies are more elongated than those which are found in internal manifestations of this disease—kala-azar—and are found especially at the periphery of the lesions. They are found very scantily in the blood obtained by the scarification of apparently healthy skin in the vicinity of the sores, but have not been found in the peripheral blood of parts remote from the lesions or in spleen punctures in patients suffering from these sores. Morphologically the bodies vary considerably; the free forms are cigar-shaped, the intracellular more spheroidal; and these latter are found only in large mononuclear phagocytes at the growing edge of the sores. The central parts of the sores consist mainly of granulation tissue, rapidly becoming fibrous, and here no parasites are present. When pyogenic infection occurs the parasites are soon destroyed. The parasites tend to early degeneration and vacuole formation, and in very chronic and particularly septic lesions are entirely absent.

Dr. ANDREW BALFOUR (Khartoum), commenting on Captain Patton's paper, stated that he had examined a considerable number of bed-bugs (*Cimex lectularius*) in Khartoum without finding any evidence of flagellate infection, but pointed out that any such research must be conducted on a large scale. There was a danger of confounding mere cultural changes in the insect intestine with a true developmental cycle. This was one of the fallacies which had to be specially guarded against, for though, as Captain Patton had said, the intestinal contents of insects were not comparable to culture media, there was nothing to prevent them acting as such in certain cases. The speaker also cited a recent observation by Captain Archibald, who had observed definite granule-shedding in flagellates from cultures of *L. tropica*, using the dark field method. In view of similar observations by Fry in the case of trypanosomes this might be of great interest, although the precise significance of this phenomenon had not yet been determined in the case of flagellates. Possibly sufficient attention had not been paid to such minute and possibly infective forms, and work along these lines might help to solve the problem of transmission in leishmaniasis as in other protozoal infections.

DEMONSTRATION OF SPECIMENS RELATING TO THE TRANSMISSION OF ARTIFICIAL CULTURES OF LEISHMANIA INFANTUM TO MICE AND RATS.

By H. BAYON,
Beit Memorial Research Fellow, Lister Institute of Preventive Medicine.

NOVY, in 1908, was the first to publish the successful transmission of artificially cultivated *Leishmania infantum* to animals. By repeatedly injecting a dog during

the course of five months with the contents of 270 culture tubes of Nicolle's strain of *Leishmania infantum*, he succeeded in finding, eighteen days after the last injection, a large number of protozoa in the spleen, liver, and bone marrow. The parasites were regained in pure culture.

A year later, in conjunction with McJunkin and Schule, the same author announced having infected five dogs, to one of which he had injected at one time the contents of twenty tubes.

Franchini injected 1 c.cm. of a culture of *Leishmania infantum* intraperitoneally into a guinea-pig, and got an infection of the animal apparently without further trouble.

Delanoe, and later Visentini, have, however, found that *Leishmania infantum* cultures injected intraperitoneally into mice and guinea-pigs are very soon destroyed, and Visentini was able to show that in the peritoneum of the guinea-pig, after an hour and a quarter, it was not possible to regain the protozoa by culture on blood-agar.

That dogs and monkeys are receptive for the "virus" (in contrast to the culture) of infantile kala-azar is a well-known fact. This experiment has been so often repeated by different workers after Nicolle's, Comte's, and Manceaux's first experiments in 1908 that it may be considered an established fact.

On the other hand, cats, guinea-pigs, and rats have been shown by Nicolle and others to resist even the injection of virus direct from the patient, so that Franchini's extremely prompt result appears to await independent confirmation.

With the intention of getting a strain of *L. infantum* virulent for animals I carried out some experiments, the corresponding slides of which I am now demonstrating.

The strains of *L. infantum* I made use of were kindly given me by Dr. Visentini, who at that time was working at the Lister Institute. One strain originally came from Tunis, having been isolated there by Nicolle; the other culture had been made in the first place by Professor Jemma of Palermo.

Both cultures grew abundantly and easily on rabbit-blood agar within five days from subculture. After fifteen to twenty days numerous rounded, non-flagellate forms are present, also numerous disintegrating, that is vacuolated and badly-staining flagellate shapes are to be seen. I have succeeded in getting subcultures also from such old tubes.

An initial series of experiments with other protozoa was carried out with the intention of showing, by microscopical examination combined with animal injection and artificial culture, to what extent the natural immunity of an animal affected the virus injected; also with the further purpose of demonstrating similar or analogous results with the cultures of *L. infantum*, should the animals injected show themselves highly immune or resistant, as was to be expected from Delanoe's and Visentini's experiments.

I was therefore comparing an immunity I knew to be definite with one whose degree I still was doubtful about.

For this purpose blood from rats infected with *T. rhodesiense*, a protozoon which we have every reason to believe is extremely difficult to transmit to birds, was injected intramuscularly into five sparrows. Their heart's blood and ground-up organs were reinjected into rats after intervals varying from twenty-four hours to five days.

In no case did the rats show any infection, so that I could conclude from these experiments that naturally immune animals were capable of completely destroying certain protozoa in their circulation within twenty-four hours.

The possibilities of the direct cultural method were now tried. It was not possible to use *T. rhodesiense* in this case, as its culture is still a matter of great uncertainty, so an easily cultivable protozoon—namely, *T. lewisi*—was experimented with. To avoid confusion with bird trypanosomes, mice were used as experimental animals, also in consideration of the fact that their immunity against *T. lewisi* is not very marked, and therefore the behaviour of protozoa towards natural immunity of an inconstant type could be observed.

Three mice were injected intraperitoneally with 1 c.cm. of rat's blood, showing very numerous *T. lewisi*. The rat had been infected with the blood taken from a wild rat. Cultures were taken from the heart's blood, peritoneum, and organs of the mice. Microscopical preparations were also made. The mice were killed after eight hours; one showed a few trypanosomes of the *lewisi* types in the blood of the heart. Partially disintegrated trypanosomes were found in the peritoneal fluid of all three, together with many motile and apparently faultlessly staining parasites. All culture tubes remained sterile.

The limitations of the cultural method appeared evident in this case, where a temporary infection was apparently in course. As a matter of fact, Rondsky has shown that mice can be infected with *T. lewisi* under certain circumstances.

I now proceeded to attempt to infect mice and rats with *L. infantum*, bearing in mind that, according to the analogy of my previous experiments, should the animals be absolutely immune against this organism, I could not expect with probability a culture even after such a short time as eight hours, and certainly not after twenty hours, as the extremely delicate method of rat inoculation had failed with *T. rhodesiense*, a protozoon which infects rats in minimal quantities, and even after forty-eight hours after the death of the host (Blacklock).

Three mice were injected intraperitoneally with 1 c.cm. each of six to ten days old cultures. The animals were killed four hours after injection; smears were taken from the peritoneal fluid and organs, and cultures from the blood, organs, and peritoneal fluid. A culture tube taken from the peritoneal fluid was successful, showing numerous *Leishmaniae* a fortnight after the others remained sterile.

In the smears taken from the peritoneal fluid the following appearances were evident:

The flagellate parasites were taken up by big mononuclear cells and disintegrated in the fashion described by Delanoe and Visentini. A certain number were phagocyted by neutrophile, polymorphonuclear leucocytes and presented the identical appearance of the rounded or oval non-flagellate stage, with or without the short rhizoplast rod which is met with in the organs of persons affected with kala-azar. I have placed a specimen showing this condition under the microscope.

Various stages of disintegration are to be seen in these specimens, and I can confirm Visentini's observation of the resistance of the flagellum to disintegration and the rounding-up of the protozoa in the protoplasma of the mononuclear cells. The observation I intend emphasizing to-day is that the rounded or oval stage of *L. infantum* which is seen in cultures resists disintegration much longer and more effectually than the flagellate stage.

This rounded shape is not in all cases a result of the transformation of the leptomonad phase, because the leptomonas condition, once enclosed in the plasma of the leucocyte, gets soon digested and loses its staining properties, whilst these rounded bodies stain sharply and clearly.

Does this observation agree with any of the facts hitherto known? Certainly it does, for we know that the "virus" from a patient affected with *L. infantum* infects animals, or in any case is capable of transmitting the disease without exceptional difficulty to dogs and monkeys, whilst the cultures are only able to infect animals after repeated injections extended over a relatively long period of time. The "virus" consists, however, of rounded, oval, non-flagellate phases of the parasite, whilst in cultures the leptomonad or flagellate stage is by far the most predominant one.

If we turn, then, to the question of insect vectors, we find that the only experiments that have any satisfactory results to show are those of Basile, with the transmission by means of *Pulex serraticeps* and *Pulex irritans*. On examining Basile's specimens, which this author kindly showed me in Rome, and one of which he has sent me for demonstration purposes, we find, again, that in the naturally infected *Pulex serraticeps* from the dog the rounded, non-flagellate stage predominates.

Similar observations are recorded by Alvarez and De Silva, who found in *Pulex serraticeps* taken off a dog naturally infected with leishmaniasis, round and flagellated stages of the protozoon. The faeces of these fleas showed the round phase only, an observation not without interest in view of the recent work of Brumpt, who has found that the faeces of *Conorhinus megistus* are capable of infecting guinea-pigs with *Schizotrypanum cruzi*.

Alvarez and De Silva did not find any protozoa in the fleas taken from healthy dogs.

It is, of course, quite easy to see that none of these observations have a decisive value, but still they seem to point to the fact that the rounded or oval stage of *L. infantum* is the infective phase of the protozoon, and that in any case the immunity of mice against the cultural stages that imitate this rounded stage is not very great, otherwise culture would not have succeeded four hours after injection into the peritoneum of the animal.

Regarding the experiments of Franchini with *Anopheles maculipennis*, we find that also here a non-flagellate stage appears to be considered infective. However, in these experiments no positive results in animals were performed; not only that, but the drawing and specimens I have seen show the parasites clearly disintegrating in the gut of the mosquito. In the last paper published in the *Annals of Tropical Medicine and Parasitology*, 1912, vi, pp. 41–52, we find that in no case is mention made of the time after infection or feeding when the mosquitos were examined. This is an important point—the principal one, in fact.

Referring to the plates accompanying the paper, we find that *de facto*, incorrect or incomplete in detail as the pictures may be, still they show clearly that the parasites are disintegrating—an opinion that is shared by Martin Meyer on page 441 of his chapter on "Leishmanien" in the seventh volume of Kolle and Wassermann's *Handbuch der pathogenen Mikroorganismen*.

This may appear severe criticism, but I can but refer to drawings appearing on Plates III and IV, on which in no case, except one, the flagellum is represented penetrating the protozoon, or rising from a basal granule near the kinetonucleus, as it does in reality, but instead, where present at all, it is seen to fade away feebly in the periplast of the flagellates—an appearance that can only be due to bad staining, incomplete observation, or both combined.

Of the many "dividing forms" figured in the plates, No. 14 on Plate III, and Nos. 7, 14, 17, 21 on Plate IV can scarcely with fairness be called "dividing forms." On this matter I can safely await the judgement of any one versed in microscopy.

I have been obliged to pay so much attention to Franchini's paper because its results, and the results of his school in general, are confusing the issues by a series of observations which do not agree with those made by other workers in the field.

The experiments with the intention of getting a strain of *Leishmania infantum* pathogenic for mice from cultures are being continued, for so far I must admit not having succeeded in finding any *Leishmaniae* in rats and mice which were examined twenty days after repeated injections of cultures.

For the moment I should like to venture the suggestion that the rounded or oval, non-flagellate stage of the *Leishmania* protozoon is the infective phase, and that the significance of the leptomonad forms in cultures is, that they correspond to the developmental, non-infective, multiplicative phases in the invertebrate host.

Somewhat analogous conditions seem to hold good with Chaga's *Schizotrypanum cruzi*, where, however, a flagellate, trypaniform phase in the "virus" is infective, but cultural forms non-infective.

PAPERS DEALING WITH SANITATION OF AGRICULTURAL ESTATES IN THE TROPICS.

I.—Malcolm Watson, M.D., D.P.H.,
Chief Medical Officer, Estate Hospitals Association, Klang, Federated Malay States.

In the tropics, especially in a new country like Malaya, and, above all, in what is practically a new industry, like plantation rubber, the problem of sanitation is not simply that of reducing a somewhat unsatisfactory death-rate. In Malaya very often the existence of almost the whole population is at stake and death sometimes lays claim to a third of the population in a year.

In such places, where everything has to be done—healthy sites found, houses built, water supplies provided, hospitals built and administered—in the face of a devastating sickness, it is essential to estimate as accurately as possible the relative importance of the factors causing the sickness and producing the death-rate. Only when this has been done will it be possible to frame any thing like an intelligent medical policy and to spend money on sanitary measures which will give the maximum result. While, if this be neglected, there may be, and often has been in my experience, the *maximum expenditure* with the *minimum results*.

Nor must the medical officer forget the necessity for economy. Neither Governments nor private individuals have unlimited money for expenditure on sanitation. Governments must find money for their roads and other public works. Sanitation makes its claim only among many equally insistent claims, and so if the medical officer "fills in" a swamp at a cost of ten times what would have been sufficient to drain it, nine other swamps must remain undrained. And so, too, with the person who lives by growing rice in a malarious swamp. He, by reason of his poverty, must suffer malaria because the removal of the malaria would at the same time remove his livelihood. At every turn sanitation and finance are inextricably associated, and the health officer—especially the health officer in the tropics—who ignores this is less than useless, he is an obstruction. Moreover, even in the tropics, nay especially when high death-rates and severe sickness are urgently calling for action, and from all quarters the medical officer is being called upon to recommend "something"—as "something must be done"—the medical officer will be wise if he recommends only measures based on experience, and is not led away into a large expenditure which may give no result, without clearly stating that his recommendation is of the nature of an experiment. For if he confidently recommends something which ultimately turns out useless, he must suffer in reputation; in other words, he loses his influence for good. While, on the other hand, if he frankly admits there is no assured remedy for the trouble, but that what he recommends might do some good, being based on a careful study of the situation, then failure, while disappointing, will do no greater harm, and the officer may learn something from it.

Finally, the wise medical officer will discuss fully with laymen of practical experience his thoughts on sanitary measures; and especially will he do so before making recommendations. Only by doing so will he thoroughly understand the problem, and avoid the many pitfalls that await those who strive to progress. And free discussion will have the further advantage of educating the layman to the aims and methods and advantages of sanitation.

Personally I firmly believe that sanitation adapted to the needs of a tropical agricultural population pays handsomely, and it should be our special aim to demonstrate this where possible to the estate manager; and to this end it is necessary for the medical officer to obtain all figures bearing on the health of his charge and their output of work. Only by this means will he obtain a clear idea of what is required and what progress he is making. The career of the sanitarian is by no means likely to be a triumphal procession. Rather will it be an arduous campaign, with surprises and ambushes, hard fights barely won, and sometimes temporary reverses; and the wise commander will by means of an efficient intelligence department seek to minimize the number of the reverses and to direct his course along the line of least resistance.

I am led to these remarks because progress has been seriously delayed by medical officers forgetting these things. Indeed I am not sure that the medical officer himself is not often the greatest obstacle to sanitation.

Malaria.

Turning now from these more general considerations to the specific problems here, in the front rank in Malaya stands that of malaria. This illustrates very well the need for the local study of the disease and the adaptation of measures to the carrier. The district immediately under my care can be divided into low-lying alluvial flat land and hilly land intersected by ravines. For the flat land the only antimalaria measure necessary is the removal of jungle and undergrowth and a thorough system of open agricultural drainage. As this is done the land becomes non-malarious; and large populations now exist

on this land, where the spleen-rate of the children is *nil* and Europeans have lived for years without contracting the disease.

But while this low-lying clay land with its high ground-water has become free from malaria by a simple system of open drains, the hill land remains persistently malarious, and the difference is due to a difference in the species of the mosquito inhabitant.

While in the flat land the carrier is *Patagiamyia umbrosus* (*Myzorhynchus umbrosus*, Theobald), a mosquito which breeds in clear pools and is destroyed by water currents, in the hill land the mosquito is *Myz. willmori*, Leicester (*Myzorhynchus maculatus*, James and Liston). The larva of this mosquito lives in clear running streams.

The method which has been adopted to deal with this has been to put the water of the ravines underground. The whole surface is now quite dry.

The engineering details I need not dwell on here, but they are essential to the success of the scheme, and each ravine must receive individual treatment. The cost works out at about 50 cents (1s. 2d. sterling) per foot of the ravine. While this is high, it will probably be reduced ultimately, and is a small item compared with the loss from malaria. The buildings are concentrated within an inner circle, and for 24 chains all round the land has been underdrained. We are still at the experimental stage as regards the total area to be underdrained. It may be found necessary to underdrain anything up to 40 chains (that is, half a mile). A radius of 25 chains gives an area of only about one quarter of that of 40 chains, and may possibly be sufficient. An area of 40 chains radius would, I have no doubt, have resulted in a striking success, but I do not think this would have been justified when one-quarter of the expenditure may be sufficient. It will at least prove of value in showing if we are on right lines, and the area may be extended if necessary.

This attempt differs from what is being done in Panama in the following respects: In Panama the antimalaria operations consist of (1) draining all land within 100 to 200 yards of houses, (2) oiling or treating with a larvicide any water which cannot be drained off, (3) making all houses mosquito proof, (4) catching any mosquitos which gain access to the houses, and (5) inviting people to take quinine.

The scheme I have adopted has been inspired by seeing how malaria has disappeared from the flat land in Malaya simply by the eliminating of the mosquito, and without the use of mosquito-proof rooms, etc. I am therefore attempting the freeing an area from dangerous mosquitos, so that men may live as in non-malarious regions, doing nothing or taking nothing which they would not do or take elsewhere. It will demand no elaborate organization such as exists in Panama. Much as we must admire it as the finest sanitary organization ever seen, it demands a discipline of the people which sanitarians will avoid if possible.

Quinine in daily doses is, of course, used, but I have long since come to the conclusion that, while death and sickness will be reduced by its use, it will never eradicate the disease.

Cholera.

Next in practical importance is, perhaps, cholera and its prevention. In Malaya it is not endemic, and is usually introduced from China or India. On the estates I isolate new coolies for a week after their arrival. When an outbreak occurs the houses (or lines—barracks containing 50 to 100 coolies) are instantly evacuated and the population housed in little huts, each containing not more than three people. The huts are arranged in rows like a camp. This is the contact camp. If a case occurs in one of these huts, the case is taken to a similar hut away from the others (the cholera camp). The infected hut in the contact camp is burned down, the remaining two inhabitants washed in a disinfectant and given clean clothing, their old clothing and all possessions in the infected hut being burned. This method of treatment is extraordinarily efficacious. Two years ago, in thirteen outbreaks, there was an average of only 3.3 cases per outbreak. So much for the actual treatment of an outbreak. We recognize, however, that safety is only to be got in pure water supplies. On the hill land, with its numerous streams and springs, there is little difficulty in this. On the flat alluvial land, however, the problem has been a much more difficult one. So far the water has been taken from shallow surface wells. It is impossible, as a rule, to dig deeper than 6 ft., for at that depth a layer of salt is found. In addition, layers of decomposing vegetable matter are often found, which give off foul gases and black stinking slime. To open into this is to render the water quite impossible, even for the least particular palate.

The last difficulty was, that being so superficial, the least drought dried the wells completely, and even in ordinary weather very large numbers of these wells or holes in the ground have been necessary to obtain a reasonable supply of the liquid, which resembles pea-soup rather than water. It has been obvious, therefore, that as a permanent supply for a large population these surface wells were useless, and when recently an attempt was made to force the estates to expend on each of these holes a sum amounting to fully £100 sterling, I strongly opposed it. The absurdity of the proposal will be gathered when it is stated that one estate with 1,200 coolies had 169 of such wells. For this estate we would then have had a total expenditure of practically £17,000. The capital of the company is £60,000.

The real solution of the problem was made some years ago when, at the instigation of the estates, the Government started on a scheme for bringing water from the hills. The cost of the scheme is estimated to be 560,000 dollars, or roughly £66,000, and is nearing completion. It will supply water to estates covering, roughly, eighty square miles. The estates are to pay 4½ per cent. on the total cost of construction and upkeep. To the estate just mentioned the annual charge will be under £300 sterling. For this there will be an abundant supply for both the population and manufacture. The £17,000 spent on brick wells and sand filters would have given it a supply probably no better than the old wells, and one which would have failed regularly with every drought. Yet not only was this seriously proposed, but the estates were threatened with prosecution if the work were not carried out.

In other parts where the estates are too far from the hills to make a gravitation supply of hill water financially practical, the proposal is to take water from a large river and pass it through either a Jewell or Candy filter. The matter is still under consideration.

Diarrhoea and Dysentery.

These are important diseases, but I do not think they are mainly or even often associated with impure water. It is rare to find the characteristics of a water-borne disease, although I have seen five or six such outbreaks. I rather incline to the view that, as with the European so with the native, these bowel diseases are due to impure food rather than impure water. The subject, however, is too large to discuss here.

Housing of Coolies.

The coolies themselves prefer what they have been used to in India—namely, little huts with cowdung floors. But most estates house their coolies in lines or barracks consisting of ten or twenty rooms back to back. The coolies can cook underneath these lines; while if the lines are only 2 ft. from the ground they cook in the verandahs, which they shut up with planks and sacks in order to exclude rain. This is undesirable, as the rooms then become dark and very dirty.

In housing coolies it is necessary, before building expensive permanent lines, to make certain the site is either healthy or can be made healthy. Thousands of pounds sterling have been wasted in building lines on unhealthy sites near to undrainable swamps. The style of building has not a great influence on the death-rate at present, but with increasing immigration will become of more importance. Above all, the estates are now practically free from tuberculosis—in marked contrast to the town populations which live in brick houses. I would rather see the coolies all back in huts like those in India than induce such a scourge as tubercle with our Western ideas of housing. I trust, however, the modern "lines" are sufficiently airy and open to prevent so grave

a disaster. The old lines with palm leaf (attap) walls were certainly free from reproach in this respect.

Ankylostomiasis.

A number of observers have worked in this field, and it is certain that between 80 and 90 per cent. of the Tamil coolies on estates harbour worms. Dr. T. S. Macaulay of Seremban has shown that *Necator* predominates and that probably only 15 per cent. of the coolies harbour more than fifty worms. This probably explains the comparative variety of symptoms due to the worm, and the fact that large labour forces may exist with very small death-rates from all causes—and that such deaths as occur are in no way connected with the worm.

In my opinion the importance of the worm as a cause of disease among Tamils has been much exaggerated, and I have heard of places with spleen-rates of 100 where the oedema and anaemia of chronic malaria has been attributed to the worm. A mistake of this kind is of importance, for while strict use of latrines and anthelmintics might cure ankylostomiasis, they would have little influence on malaria. With regard to the prevention of the spread of the worm, one difficulty in Malaya is that with the high wages he makes the average stay of the coolie is only one and a half years. He then returns to India for a more or less prolonged holiday, and very often is set up in life with his little fortune. To replace him his string of relatives come over, and so there is a constant flow of new coolies. The general use of thymol among Tamils, as is done in Java with Mohammedan Javanese, would probably lead to disaster, since the Tamil is so much addicted to alcohol. Thymol, beta naphthol, and eucalyptus are very frequently ineffective unless repeated time and again. So that while, perhaps, more might be done, among Tamils it will have to be done cautiously and tentatively before any general recommendation is made.

The general use of latrines is also not without difficulty. First, there is a caste trouble; next, there is the general (probably universal in all races) dislike to a public latrine when an open field is available. The difficulty of making a horse drink is at least minimized by the possibility of leading him to the well. But the compulsory use of latrines on estates has nothing in its favour.

The problem is a difficult one, nor is it quite apparent to me what advantage there is in a shallow trench if the worm is an inhabitant of the surface layers of the soil. To destroy the worm it would apparently be necessary to burn the motions, which has not yet been suggested for estates. Nevertheless, I am in favour of the use of shallow trenches carefully covered with earth at least twice a day. I think whatever effect it may have on the ankylostome worm, it at least will help to diminish germ infection from indiscriminate defaecation, and tend towards greater purity of earth and air and water. I am conscious this has been only a hurried review of a large subject, but I trust it will lead to a discussion of value.

II.—W. Carnegie Brown, M.D., M.R.C.P.,
London.

In agricultural undertakings, practically all of which are commercial ventures which rest entirely on their financial success, and which would be abandoned were they unremunerative, sanitation is of course no less important, but it must never be forgotten that it is based on entirely different conditions to those which obtain in urban communities, where there is a settled population with a substantial background of valuable and assessable property. And there can be no doubt Dr. Watson is right in the emphasis with which he insists on this point of view being strictly borne in mind; for it must be confessed that Governments and local authorities, as well as estate and plantation managers, have in many instances been led into deplorable difficulties by the mistakes, and especially by the financial mistakes, of their sanitary advisers. It may be that in our public health training insufficient attention is given to finance, that sanitary officers are accustomed to regard financial considerations as being to a large extent beyond their province, and that questions of cost and the results to be obtained from expenditure consequently receive insufficient attention from them. In dealing with the sanitation of estates, then, it must always be borne in mind that there is no money to play with, and that unless sanitary improvements in common with other operations show a reasonable return on expenditure, they are impracticable and impossible.

My own experience of estate sanitation indicates that the following are the essential conditions of success, and I give them in the order of their importance:

(1) The provision of a plentiful supply of pure drinking water.
(2) Permanent antimalarial precautions.
(3) A suitable dietary.
(4) The effective sterilization or destruction of sewage.
(5) General cleanliness, and the removal of all filth and rubbish.

The Provision of a Pure Water Supply.

In selecting and laying out an estate no consideration is of greater moment than that of securing a reliable and readily available supply of good water. Infections of epidemic cholera, dysentery, and typhoid fever, in my experience, are almost invariably waterborne, and the first line of defence against epidemic outbreaks of these and a host of other intestinal disorders is to provide an abundance of wholesome drinking water. The facility with which this may be accomplished naturally varies with the position of the sites which are chosen for bungalows and coolie lines; and it is, of course, always advisable to take the supply from the source which is least liable to taint. Whenever possible, the drinking water of an estate should be collected, as suggested by Dr. Watson, from a jungle catchment area well above the level of a habitation, and it should then be brought by a pipe-line from a small protected reservoir direct to the houses. In most cases, however, this is impracticable, and it is generally necessary to have recourse to wells or to river water as a source of supply.

Surface wells—that is to say, shallow wells which are filled by the gravitation of surface and subsoil water—are always dangerous; but away from the coast, if the impervious layers of the upper strata are pierced, a fairly reliable supply may often be obtained from a deep well. Protection from pollution must, in the case of all wells, be secured by a waterproof parapet and by a concrete pavement, sloped outward and extending for 12 ft. or 15 ft. round the opening. A river furnishes a much more questionable source of supply, for although water may be effectively purified by a comparatively short flow in a stream, river valleys in the tropics are generally so densely populated that freedom from pollution is rarely attainable. On rubber estates it is seldom necessary to store rain water, but in a country where there is an annual rainfall of from 100 in. to 120 in. this is always available. If it has to be collected the pipes should be fitted with a simple apparatus which is in general use in many parts of Australia. This appliance prevents the first water which falls on the roof from entering the storage tank, but after a certain amount of rain has fallen, a shoot turns automatically and water from a clean surface is secured. But in the tropics, with the possible exception of the first, all these natural sources of supply are unreliable; and in thickly populated districts, and on estates where a large force of native labour is employed, rivers and wells are specially open to objection. Practically, from whatever source water is derived contamination may take place; and as heat is the only effective method of sterilization, it should be made an invariable rule to *boil all drinking water*, and after boiling, to keep it as far as possible sterile.

The sterilization of water on a large scale has recently received careful attention, and it is now possible for a very moderate outlay to instal an appliance by which all the drinking water required on an estate may be effectively and economically sterilized. In one pattern of water sterilizer—the Lawrence—with which I am familiar, and which is in use on several estates in the eastern tropics, the water to be purified first enters a heat interchanger, provided with an inner cylinder or tube, where it is raised to a temperature of about 180° F. by the boiling water returning from the sterilizing chamber. It then passes to the sterilizing chamber, where it is brought to boiling point by additional heat, which may be derived either from ordinary fuel, or from gas, oil, or the injection of live steam. The prohibitive cost of raising cold water to a

temperature of 212° is thus ingeniously avoided, and—a point of importance in the tropics—the effluent water is at the same time cooled and aërated. Whatever form of apparatus is selected, the following points should be borne in mind: It should be simple and easily worked; all the parts should be readily accessible for examination and special cleansing; and it should be able to deal with the water directly—that is to say, no preliminary preparation by chemicals or otherwise should be necessary. When there is much sediment—a frequent result of tropical rain—a filter may be employed as a preliminary measure; but filtration is useless for sterilization, and filters, dripstones, etc., may themselves prove a fresh source of contamination. On no account should water be filtered after it has been boiled, and it should be taken for consumption direct from the storage tank. As a rule, sterilized water is perfectly free from taste; and when an aërating sterilizer is used, it is particularly clear, bright, and sparkling.

Antimalarial Measures.

It is unnecessary to do more than to emphasize the whole of Dr. Watson's advice as to antimalarial measures, but in practice, in order to secure satisfactory results in the general sanitation of an estate, a few specially selected and specially paid coolies—say 3 per cent. of the labour force—ought to be permanently detailed to carry out these and other necessary measures under competent supervision. Their duties, apart from drainage and petrolage of swamps, canals, gutters, etc., should include the removal of broken bottles, tins, and other rubbish where mosquitos may breed, the emptying of unused baths, etc., the screening of necessary water barrels and cisterns, and the fumigation of dwellings, coolie lines, and stables. For the latter purpose green bamboo twigs, burned on charcoal braziers, are generally sufficient, but sulphur candles may be necessary to kill the adult *Anophelines*, which often congregate in enormous numbers under the tiles and thatch of estate dwellings.

In a malarial district infection is mainly derived from native children, who generally harbour large numbers of parasites, although they show no obvious signs of illness. The question of how to deal with carriers—both child and adult—is a very difficult one—for their discovery and segregation are practically impossible. In many French colonies, where, as in some of our own dependencies, education is compulsory, excellent results have been obtained by the administration of quinine in the schools; and the action of the Indian Government in making quinine everywhere readily accessible has materially diminished the enormous toll of human life and human suffering which malaria formerly levied on the peasantry of that country. Used merely as a preventive of malaria on an estate, quinine is often of great value, but I agree that less reliance should be placed on its administration than on mosquito destruction. Both in prevention and in active treatment quinine must be given regularly, and continued for six months after attack. If a patient under treatment stops taking quinine before that time because he has no more fever he generally gets a relapse, and as he is infective to mosquitos he is a source of danger to others. A native protects himself at night by enveloping the whole of his body in a sleeping cloth, but for Europeans everywhere in the tropics the systematic use of mosquito curtains is imperative. Part of the verandahs of every bungalow should also be made mosquito proof, and all hospitals, etc., where malarial patients are under treatment should be carefully screened.

The Disposal of Sewage.

On most estates insufficient attention has been paid to the destruction of night-soil, and I do not find myself in agreement with what Dr. Watson says on this very important subject. To arrest the spread of ankylostome infection it is necessary to prevent pollution of the soil, and, when it has become tainted, to protect the feet of the workers. For the latter purpose boots, unless they are watertight and reach well up the leg, are useless, and an inexpensive substitute which is preferred by native labourers, and is quite effective, is to smear the skin with a thin coating of tar and sand; at the same time it is imperative to destroy all estate sewage. This is usually effected by a system of pail latrines and a small furnace and several varieties of moderately priced incinerators are now in use in asylums, gaols, hospitals, and on many estates in the tropics. Here, again, the simplest types of apparatus are the best, and a locally constructed but thoroughly efficient sewage destructor sufficient for a labour force of four hundred men can generally be installed for a very moderate outlay. When in working order, such an incinerator should be able to consume 500 lb. of matter nightly at a cost of 2 cwt. of firewood and 40 lb. of coir dust for admixture. Suitable estate rubbish, old gunny bags, etc., are generally available as additional aids to combustion, and two coolies at a daily wage of 65 rupee cents are sufficient for the whole of the work. Such an apparatus is actually in use on several estates in the East; and although more than one may be necessary, after their introduction no special difficulty has been found in making their use compulsory. Incinerators are, of course, largely employed in gaols, asylums, and elsewhere in India.

Estate Dietaries.

As a rule, managers are fully aware of the necessity of strict supervision of the food supplied to their labourers, and on most estates the diet is good, abundant, and nutritious. But it must be remembered that unexpected danger may lurk in food which is apparently perfectly wholesome. It is more than probable, for instance, that the terribly fatal disease beri-beri is caused by a deterioration in the quality of rice—invisible and unknown—but which in all likelihood is set up by the outer layers of the grain being removed during milling. At all events the disease chiefly affects Chinese, and does not occur in Tamils and other natives who use "cured" and freshly husked rice; and it is known that, in the early stages at least, beri-beri can be arrested by substituting "cured" for white rice. The value of this discovery will be appreciated by every one who is familiar with the labour problems of the eastern tropics, and, although the probability of a serious outbreak of beri-beri on a rubber estate is more remote than in the case of some other industries, its economic importance is enormous. Even as I write I have received a letter from an employer of Chinese labour, who states that whereas a short time ago he lost three hundred out of every thousand coolies from beri-beri alone during the first year after they were imported, since he introduced freshly husked and "cured" rice his total death-rate from all causes is only 35 per mille.

A claim that beri-beri or any of the other protean maladies of the tropics can be entirely eradicated is, however, premature. Incessant vigilance will always be necessary for their repression, and retribution will be the certain reward of apathy and negligence. But it is not too much to assert that the difficulties of estate sanitation have been immeasurably lightened by a knowledge of the causes of tropical diseases, and that proved methods of prevention, intelligently directed, are abundantly sufficient for their control.

III.—W. F. Law, M.D., F.R.C.S.I.,

British Guiana.

Our object should be to attain the highest sanitary level at the lowest possible cost to employers, a point which is sometimes lost sight of by our profession.

Houses.

One of the first points of importance is to see that every apartment has plenty of permanent ventilation, that is, ventilation which is independent of door and window, and which cannot easily be stopped up; and that the range or house is well raised above the surrounding level so as to facilitate drainage and keep the structure dry. Perhaps the best way to convey my meaning is to give a short description of what in British Guiana we consider a good yard, it being borne in mind that the country is absolutely flat. In choosing a site for a yard we select a spot as high and as open as can be got.

The dwellings are built of wood in ranges of 100 ft. each, divided into ten rooms, each room being 10 ft. by 14 to 15 ft., and provided with a gallery along its leeward side.

All along the roof on leeside, in about its upper third, is a fixed ventilating space locally known as a "cow mouth," whilst where the roof meets the plate there is an eave space back and front.

There is a window opposite the door, and each end room has two windows and a large gable end jalousie above the end window. Ample ventilation is thus provided which is difficult to block up.

The range is well raised above the surrounding level, and each room is considered capable of accommodating three adults.

The ranges are built in lines, with suitable distance between each range, and between each line of ranges, this latter not being too great, so as to enable the ground between to be drained by a small, shallow, open trench running midway between the two lines of ranges.

Each of these small drains is graded, so as to allow a steady fall into the main drainage trench, which runs at right angles to it along the outer side of the yard, and is just deep enough to carry off the surface water, but not so deep as to hold water permanently. If the ranges are sufficiently raised there will be a good steady slope from each range to the small trench, and the yard will remain dry; but it is important that this ground be kept smooth and even, that grass, if any, should be kept very short, trees and gardens being prohibited, whilst cattle are most rigidly excluded.

If this plan is followed, it gives a compact, but airy and dry yard with well ventilated houses and fair accommodation.

Water Supply.

In the matter of water supply, I shall not ask any one to follow the example of British Guiana estates. I look on it as one of our weakest points, and have fought long and unsuccessfully against the system. It consists of fairly good, rather dark, but reasonably wholesome water, brought in open trenches from the conservances aback and stored in open trenches close to or in the yards.

It is liable to contamination at any stage of its journey, and I cannot imagine any system more dangerous. The plan I have always advocated, and which has been in use on one estate for many years, is the storage of rain water in large concrete tanks, and conveyed from these tanks to the yards by pipes, and delivered from standpipes. The tank I refer to holds some 210,000 gallons, and is filled from the factory roof. The method is a good one, but I would prefer several smaller tanks rather than one large one, as they could then be regularly cleaned out without inconvenience. On one or two estates in British Guiana we had some success with small tanks, iron or concrete, put up in the yards and fed from the roofs of ranges—one tank to every two or three ranges; this gave a good and convenient water supply, and helped to keep the yard in better order. The cleaning out of these tanks is a matter of great importance.

A few years ago (in 1907) I investigated, along with Dr. Wise, our bacteriologist, an epidemic of dysentery which had broken out at the Almshouse in Georgetown. Rain water stored in large tanks was the water supply, and we traced the disease to contamination of the water by the excretion of carrion crows. Numerous pathogenic bacilli were isolated from the water, and the same bacilli were afterwards found in the intestines of the carrion crows.

Recently Drs. Wise and Minett have devised a method of rendering impure water safe and wholesome by treating it with alum and chloride of lime, but Dr. Minett will be able to give an account of this himself.

Latrines and Sewage Disposal.

This is a point of immense importance, but one that, at any rate in British Guiana and the West Indies, has been entirely neglected until quite lately. It would seem absurd to waste time advancing arguments in favour of latrine accommodation for labourers, and I shall not do so; but it is only seven or eight years since I was laughed at by managers of sugar estates for suggesting such a thing, the chief argument being that the East Indian coolie would not use them. We have proved in British Guiana that the East Indian can, and will, use them, and is only too glad to get them; and now every estate in the colony has ample latrine accommodation, and the managers who formerly laughed at me are now firm believers in the system and its usefulness in preventing disease.

The question, therefore, no longer is: Shall we have latrines? but, What class of latrine is the best? and, What is the best method of sewage disposal? This question must be answered by each country for itself, in accordance with local conditions. In theory the correct method would be one by which the effete matter could be collected, rendered innocuous, and returned to the land; but there are difficulties, and in British Guiana we have not attempted anything so elaborate. My plan was to devise a cheap and satisfactory method which would be acceptable to the East Indian, and would not prove too great a burden on the estates. With this in view we placed our latrines either over the large drainage trenches, or over smaller trenches leading directly into them, and so the faecal matter was carried away direct to the sea. There were a few instances in which suitable trenches were not available, and in these cases we adopted the bucket system with burial of contents. The provision of these simple structures has already effected a considerable improvement in the health of the labourers.

The points I have thus briefly mentioned give us for our labourers good, well ventilated houses in a well-laid-out and properly drained yard, a good water supply, and good latrine accommodation. It must not be forgotten, however, that these three primary desiderata cannot be maintained in a state of efficiency without constant work and intelligent supervision. The keeping of a yard in proper order entails the constant employment of a small gang, whose business it would be to keep down grass, attend to the small drains, fill up holes and irregularities in the ground, and collect and remove all rubbish; whilst the latrines require the constant attention of a good scavenger to wash them down every day, or even twice daily. It would repay an estate to have such a gang, under the leadership of a well trained inspector, who would provide the brains and direct the work along intelligent lines.

Special Methods directed against Malaria and other Diseases.

Several of the points I have already dealt with, such as thorough drainage of yards, removal of rubbish, especially old tins, bottles, and other receptacles, the keeping down of grass and "bush" and the filling up of holes, are useful in the prevention of malaria, since they do away with a good many of the breeding places of mosquitos. Tanks and vats must be efficiently screened, and swamps and marshy places, if in the region of dwellings, should be drained if possible. Large collections of water and deep trenches are not a source of danger provided they are well stocked with fish, and are kept free from weeds and have clean cut banks. In British Guiana we have had considerable difficulty in dealing with water barrels, which the labourer is so fond of keeping close to his door. These are a great source of danger, and though we insisted on their being screened, we found that the screening was constantly being broken. The only safe proceeding is to have a good convenient water supply such as I have recommended above, and absolutely prohibit all water barrels.

It is impossible in a short paper to deal fully with all measures necessary for a complete antimosquito campaign, but I may here say that in our colony our efforts to lessen malarial fever by antimosquito measures have to a great extent been counteracted by the rapid increase of rice cultivation. In spite of warnings it is being grown far too near the dwellings of labourers and others, to the great detriment of the health of the colony. Of late years the medical department has endeavoured to induce estates authorities to persuade and insist as far as possible on all their employees taking a daily dose of quinine. It was only in 1909 and 1910 that this measure came at all fully into action, and though it is too soon to draw any hard-and-fast conclusions, we can say that so far the outlook is most hopeful.

As in 1910, the number of cases admitted into estates hospitals showed a reduction of 5,800 on the next lowest year, whilst last year there was a further reduction of over 6,000 cases.

In advocating this method of prevention I met with, at the outset, just as much opposition as I had encountered over the latrines, but before I left the colony I had the satisfaction of knowing that the most influential of the employers of labour were on the side of the medical department in this matter, and that the work would be continued on an even wider scale.

As regards the prevention of ankylostomiasis and other intestinal parasitic diseases, I have already dealt with the latrine question, and this measure, along with recognition and treatment of infected cases in the early stage, constitute all the preventive measures necessary. The evidence in favour of the ankylostome becoming sexually mature outside the human body appears to have

no foundation in fact, and if this is so, I cannot think that infected ground could long remain infected if left unpolluted by man.

Ankylostomiasis and malarial fever I look on as the two greatest destroyers of labour in the tropics, and unfortunately they work together far too well. Therefore the strongest efforts should be made to combat both; and in doing so I think the employer of labour will get a good return for his money.

IV.—K. S. WISE, M.B., B.S.Lond., and E. P. MINETT, M.D.Brux.,

British Guiana.

1. *The Disposal of Faeces.*

THE problem of faeces disposal is by no means an easy one in British Guiana, because the usual methods are not practicable. The whole country is absolutely flat, below high tide level, and the soil consists of a stiff clay almost impervious to water. Therefore gradient drainage is out of the question, as a fall is impossible; close or wide irrigation useless, as the water cannot penetrate the heavy clay, and is liable to drain off into drinking water canals. Trenching, either deep or shallow, is also impossible, as trenches filled with night-soil simply remain a filthy putrefying mass, no moisture escapes except by evaporation, and the trench becomes practically an open septic tank (by virtue of the thick scum on the surface); heavy rains cause these to overflow on to the surrounding land, and they become a serious nuisance and danger. Further, these spots invariably breed enormous numbers of flies, chiefly *Muscidae*, which quickly become an intolerable nuisance. Within recent years more than one epidemic of typhoid fever has been directly traced to flies under the above conditions.

Any pipe system is out of the question, owing to the cost of connecting up a large number of widely scattered coolie ranges, and, further, a fall of even 1 in 40 is in most cases impossible. The clay soil being unstable, the pipes readily break across and become displaced.

Properly constructed latrines have been built in some instances, the soil being removed by means of buckets and buried; the objection to this method is that the coolies will not go to any distance to make use of them, and the land is unsuitable for burying this night-soil.

Under these circumstances an open water carriage system has been adopted on most of the estates in British Guiana.

Latrines are constructed on narrow bridges over an open trench in the centre of coolie yards and between the ranges. These latrines have walls of corrugated iron and wooden floors, in which holes are left through which the faeces drop directly into the water beneath The trench itself is usually about 6 to 5 ft. wide, about 5 ft. deep; it is kept filled with water and flushed periodically by means of a sluice.

This system, although open to many obvious objections, has been found satisfactory on estates bordering on the rivers, since here a shorter outlet channel (500 yards) is customary, and a greater fall is obtained. On estates bordering on the sea-coast the conditions are less favourable. The outlet channel is two to three miles long, the fall is very slight, and the stream is stationary when the sluice is closed at high tide and sluggishly moving when the sluice is open at low tide. In times of drought an insufficiency of water is maintained in the trenches.

We are at present experimenting with various schemes for the biological disposal of sewage on these estates, based on the principle of a grit chamber, leading to an enclosed septic tank of reasonable capacity, so arranged that the overflow from this is conducted down an open gutter filled with coke or clinker, to act as a nitrifying bed. It is hoped to provide a satisfactory effluent which can be run into the main draining trench and not be offensive. Our experiments are at present not sufficiently advanced to enable us to quote analysis of the contents of the septic tank and of the finished effluent, but we have r ason to think that this system is likely to be satisfactory, and to require little, if any, attention once installed and started.

So far, our experiments go to show that biological changes only go as far as ammonia (NH_3) compounds, owing to reducing substances in peaty water, or absence of nitrifying organisms. We never get nitrites or nitrates present in effluent to any amount.

2. *Drinking Water Supplies.*

This would not seem a difficult question in a flat country where the ground water level is rarely more than two or three feet beneath the surface and where the average annual rainfall is approximately 100 inches. It is not so much a difficulty to supply water—there is usually more than a sufficiency of that; but the real difficulty is to provide a drinking water supply of reasonable purity. The usual sources of supply are:

1. Rain water collected from the roofs of the coolie ranges and various other buildings.
2. Impounded peaty savannahs, and river water conducted on to the estates by means of open canals.
3. Well waters from various depths.

To deal with the third variety first: It has been found in most cases that the water derived from artesian wells at depths varying from 10 ft. to 160 ft. was too brackish and too hard for general use. These waters, somewhat milky in appearance, have a distinctly earthy odour, and are usually alkaline in reaction. The following analysis shows their average composition, expressed as parts per 100,000:

Free ammonia, from 0.04 to 0.18 part; albuminoid ammonia, from 0.4 to 0.27 part; chlorides (expressed as Cl_2), 27 to 250 parts; nitrites, absent usually; nitrates, traces occasionally; total hardness ($CaCO_3$), 5 to 44 parts; total solids, 73 to 112 parts; organic, 2.5 to 8 parts; inorganic, 70 to 104 parts; phosphates (estimated as P_2O_5) are present in varying quantities, ranging from 1.0 to 5.5 parts.*

From a bacteriological standpoint, these waters are fairly pure when protected from surface contamination.

Rain water is conserved largely by collecting the rain falling from the roofs by the coolies. The principal objection to this system is that, apart from the possibility of roof contamination by dust, carrion crow faeces, etc., the coolies persist in using vessels such as barrels, tubs, and jars to contain the water, and as the majority of these are unscreened or screened very inefficiently they quickly form most suitable breeding places for mosquitos. On some estates rain water is collected from a number of roofs and collected into large concrete tanks situated partly or wholly beneath ground level; these tanks are usually well roofed over and screened more are less efficiently. Water conserved in this manner undergoes a considerable amount of self-purification, but is of course always liable to fresh pollution from the roof collecting areas after each shower of rain.

Two analyses of water taken from rain water tanks of this description during the dry season are given in Table I.

As will be seen, these waters are of fair quality, and passably free from dangerous pollution. We have recommended that these stored waters be rendered safe by the addition of 1 oz. of fresh chlorinated lime per 1,000 gallons (two parts Cl_2 per 1,000,000) occasionally—say monthly—in the wet season and every three months in the dry season. Occasionally, in a few instances, the roof water is simply conducted by pipes into an open pond or trench; this system is, of course, open to many grave objections, and is discouraged as much as possible unless the trench can be properly protected from surface pollution.

The other water supply is not as satisfactory nor easily controlled. It consists in digging long trenches about 12 ft. wide, 4 to 6 ft. deep, alongside the coolie ranges. The peaty, brown-coloured savannah water is then simply allowed to run into these trenches, and dipped for use as required.

This mode of water supply has many very grave objections. The trenches are often by the side of the road, and receive road surface washings, etc. Besides, as they are often unfenced, animals can be frequently seen wandering about them. But the worst objection is that they nearly always get polluted by refuse, etc., from the yards and drainage trenches in close proximity, especially in wet weather, when the yards are flooded.

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* In quoting analysis as above, the samples 1 and 2 are identical in each set of analyses. Also, for the sake of brevity, only two examples are quoted, representing a large number.

TABLE I.

Chemical Analyses.

Sample.	Reaction.	Ammonia.		Chlorides.	Nitrites.	Nitrates.	Total Hardness.	Phosphates as P_2O_5.	Solids.		
		Free.	Albuminoid.						Total.	Organic.	Inorganic.
1	Neutral	0.045	0.035	1.3	Nil	Traces	1.7	0.23	6.0	4.5	1.5
2	Neutral	0.016	0.045	0.7	Nil	Traces	4.0	0.23	12.0	3.0	9.0

Bacteriological Analyses.

Sample.	Total Organisms per c.cm.	Faecal Organisms per c.cm.	Faecal Organisms Isolated.	True B. coli communis.
1	135	Absent 6 c.cm.	Nil 6 c.cm.	Nil
2	2,080	Present 1 c.cm.	B. lactis aërogenes; B. cloacae; B. acidi lactici	Nil

Examples of analyses of water supplies of this description are given in Table II.

As will be seen, these peaty waters very soon become heavily polluted with excremental organisms, and cannot be considered as in any way satisfactory.

3. *Housing.*

With regard to this subject we do not think that we can do better than quote parts of the existing building regulations. The coolie ranges in this colony are built of wood, but they are extremely well constructed and kept in first class order, especially on the estates where indentured coolies are employed:

1. On any plantation where new dwellings for indentured immigrants are required the manager shall give in writing one month's notice to the medical inspector of his intention to build such dwellings, at the same time describing the site on which they are to be erected.
2. No such dwelling shall be erected without the approval of the medical inspector.
3. Each range shall be a single story building, constructed on the following plan:
   - (*a*) Length, either 50 ft. or 100 ft., and divided accordingly into five or ten rooms, each room to be numbered consecutively.
   - (*b*) Breadth 14 ft.
   - (*c*) Height from upper side of sill to lower edge of wall plate 7 ft. 6in.
   - (*d*) Height to apex of rafters from top of wall plate 8 ft.
   - (*e*) Height of upper side of sills from ground level not to be less than 2 ft., and in special cases to be higher, if required by the medical inspector and approved by the surgeon general.
   - (*f*) The roof may be either shingled or covered with corrugated galvanized iron sheets, and need not be close boarded.
   - (*g*) The floors may be either made of boards laid on floor beams or made of earth raised to the level of top sills and well rammed.
   - (*h*) The walls shall be of close boards.
   - (*i*) Each room shall have a window on the windward side and a door on the leeward side, or there may be a door on each side; if the latter, then the door on the windward side shall be in halves, so that the upper portion can form a window. Each room shall contain a platform or other suitable arrangement for sleeping, to be approved by the medical inspector.
   - (*j*) The partitions between the rooms shall be close boarded with grooved and tongued joints to a height of 2 ft. above the plate, the space above that to be close lathed.
4. Each range shall have a gallery not less than 6 ft. wide by a height of not less than 5 ft. in the clear, and running the whole length of the leeward side.
5. Permanent ventilation shall be provided as follows:
   - (*a*) A leeward "cow mouth," 4 in. high, running to within 2 ft. of each end of the roof.
   - (*b*) The rafters shall be placed on interties, which on the leeward side are to project 3 ft., and on the windward side 1 ft. The ventilating spaces thus formed shall be lathed, not boarded.
   - (*c*) There shall be a series of louvres at both gables, extending from the apex of the rafter downwards to a distance of 4 ft.
6. Each range shall be provided with a distinguishing letter, and each room numbered.
7. Each range shall be placed on a dam not less than 36 ft., or more than 60 ft., wide, with a small drain running both in front and behind the range, and leading on to the main drainage; the ground shall be sloped off towards these drains.
8. The distance between the gable of one range and the nearest of the next range shall not be less than 40 ft., or more than 50 ft.
9. The distance between the front of one range and the back of the one next in front shall be not less than 50 ft., or more than 75 ft., except with permission of the medical inspector.

The only improvement that we are of opinion would be of value in the above is this, that if the ranges are raised from the ground at all they should be raised at least 6 ft. As a general rule all houses in British Guiana are best if raised a good height from the ground.

DISCUSSION.

Lieutenant-Colonel JOHN K. RITCHIE, R.A.M.C., said: I have listened with great interest to Dr. Malcolm Watson's paper. Like everything he has done, it shows that genius for clear thinking and hard working which has made him one of the pioneers in the great efforts for the restriction of tropical disease which has been perhaps the most important achievement of the last years of the nineteenth and the first decade of the twentieth century. Its scope

TABLE II.

Chemical Analyses.

Sample.	Reaction.	Ammonia.		Chlorides.	Nitrites.	Nitrates.	Total Hardness.	Phosphates as P_2O_5.	Solids.		
		Free.	Albuminoid.						Total.	Organic.	Inorganic.
1	Neutral	0.028	0.064	0.80	Nil	Nil	1.80	0.12	20	16	4
2	Faintly acid	0.100	0.150	1.5	Traces	Traces	2.0	0.50	43.6	30.6	13,0

Bacteriological Analyses.

Sample.	Total Organisms per c.cm.	Faecal Organisms per c.cm.	Organisms Detected.	True B. coli communis.
1	2.600	10	B. cloacae; B. oxytocus; B. neapolitanis; B. violaceous	Absent 3 c.cm.
2	38,000	1,000	B. lactis aërogenes; B. ent. sporogenes; S. faecalis	Present 3 c.cm.

has been coextensive with his subject. In criticizing it, or rather in expressing my views on it and the other papers we have listened to, I shall confine myself to anti-malarial measures and sewage disposal. On the other points we are all agreed. As regards the former, it may not be without interest to the meeting if I state that I have formed the opinion that, good as all the other methods for the reduction of malaria are, the best is the prophylactic administration of quinine. It is almost a counsel of perfection to expect in a flat soil that stagnant water can be prevented, and the smallest surface is a breeding place for *Anopheles*. In Multan in 1909 all the usual methods were used; in 1910 I concentrated myself on quinine. I was surprised that my friend Dr. Watson advised the daily administration of quinine. Considerations founded on the life-history of the organism made me believe that a weekly administration of quinine was all that was necessary. By giving 15 grains every Thursday, cases of malaria were reduced 70 per cent.; that is to say, there were three cases for every ten the year before. Idiosyncrasy must be considered, and where the slightest cinchonism is produced the dose should be reduced, but I found few men who could not take 15 grains without discomfort. The shallow trench system appears to me better than the incinerators. In the flat this can be carried out easily. It certainly is more economic, as it returns nitrogenous matter to the soil. The desideratum is plenty of ground and very careful supervision. It is best to divide a large piece of ground into five parts, four of which are under cultivation, while the other is used for trenching.

Major S. R. CHRISTOPHERS, I.M.S., said: There is one aspect of malaria prevention in the case of labour in the tropics that has not been emphasized in any of the papers read to-day, and this aspect is to my mind most important—namely, the economic. I mean economic from the point of view of the coolie. About a year ago, along with Dr. Bentley, I read a paper on what we called "Tropical Aggregation of Labour," and we showed that malaria when it decimates, as it often does, native labour communities, derives its intensity from the occurrence of economic stress among the coolies. This stress is, curiously enough often hidden, but it exists none the less, and the very first antimalarial measure in the case of a labour force suffering severely from malaria is the close investigation of the economic conditions as they affect the individual coolie in this community. The rectification of economic errors (and these may not be always on the surface) is the first step in malaria reduction under these conditions.

Dr. W. F. LAW (British Guiana) said: In British Guiana we have advocated the habitual administration of quinine. The amount given practically works out at 5 grains three times a week, and I consider this better than one large dose each week. Charts which I had instituted showed that ordinary measures were producing little or no effect in the reduction of malarial fever. We therefore instituted the daily administration of quinine. This, as the figures given with my paper show, has reduced the amount of malarial fever by more than one half. In a very flat country such as British Guiana, it is most difficult to eradicate the mosquito; therefore, quinine prophylaxis is necessary as a supplemental measure. We gave our quinine in the form of tablets made specially for us by Howard and Son, and by their use we find the quinine is taken much more readily.

Dr. E. P. MINETT (British Guiana) was of opinion that mosquito campaigns should be the first line of defence against malaria, because of the serious results apart from the febrile reaction—for instance, anaemia and general weakness. But quinine was a good second line, and should be used in conjunction with mosquito destruction. In British Guiana they gave 5 grains three times a week, instead of 15 grains in one dose, as suggested by Lieutenant-Colonel Ritchie. Because, although quinine diminished the results of infection in the way of fever, still it did not prevent the actual reinfection.

Captain C. RYLEY, R.A.M.C., said that in Hong Kong two companies of a European regiment recently arrived from home, and therefore malaria-free, were ordered to proceed to a camping ground which was known to be malarial. In order to test the efficacy of quinine as a prophylactic, a daily dose of 5 grains of the sulphate of quinine were given daily to one company, the other company getting no quinine, the idea in the first place being to keep a small amount of quinine in circulation to destroy the sporozoites as they entered the body. The result of the experiment was that 47 per cent. of one company and 49 per cent. of the other were found to have benign tertian parasite.

Dr. W. T. PROUT, C.M.G. (Liverpool) agreed with Dr. Watson as to the necessity for common-sense schemes, but considered that while there was a danger of extravagant schemes being put forward, there was an equal danger of being too economical. It was not his experience that any executive, whether government, commercial, or agricultural, was ever in danger of giving too much, the usual tendency was to give much too little. Within the last ten years a vast change had taken place in the point of view as regards sanitation in the tropics. They had known for many years the lines on which water supply, sewage removal, etc., should be organized and carried out, but now with the discovery of Ross they had a new element introduced, and now tropical sanitation resolved itself largely into a war against insect-borne disease. The problems involved were very complex, and an intimate knowledge of parasitology, of the life-history of insects, of native habits and surrounding was required. He considered that the whole question of tropical sanitation required co-ordinating, and he advocated the formation of a central advisory board for all the colonies, on which men with practical experience in the tropics would sit, and which would collect information and advise on any matters connected with the pressing needs of the various colonies.

HELMINTHIC TOXINS.

By M. WEINBERG,

Paris.

WORMS play a very important rôle in tropical pathology. Their action on the organism is not, however, completely elucidated. In the course of the last ten years I have been much occupied with the part taken by worms in the etiology of certain infectious diseases. It is actually definitely admitted that intestinal parasites and worms in general are capable either of inoculating microbes directly, or of favouring their penetration into the organism. But though this is true, it is not a characteristic of the action of all worms. It has been supposed for a long time that worms secrete toxins, but the authors who have been engaged in this question have not brought forward sufficient proofs in favour of this theory. However, researches undertaken for some time by a certain number of authors have placed in evidence a large number of facts which permit us to affirm that the parasites secrete toxic substances, and that these substances are absorbed by the host, in the organism of which they often provoke considerable trouble. We can divide all the facts which prove the existence of verminous toxins into two principal groups:

1. Into those of which we have direct proof.
2. Into others, which furnish us with the proofs just as conclusive, but indirect.

The indirect proof of the intoxication of the organism in helminthiasis is brought forward by the presence of eosinophilia. The researches of Achard, Prötcher, and those which have been made by us in collaboration with Moore, Alexander, and Hugo Mello, have shown that this eosinophilia is due exclusively to the action of parasitic substance on the haematopoietic organs. They have explained why this eosinophilia diminishes, and even disappears completely, under the influence of a very intense infection, or even in the course of an infectious complication. We have searched for a long time for direct proofs of the toxicity of worms. Guided by the anaemia observed in the course of ankylostomiasis, some observers (Calmette and Bretoni, Luigi, Preti, etc.) have discovered that extracts of ankylostomes are capable of destroying the red blood corpuscles. It has been shown that all parasites, worms, or insects which live on red corpuscles elaborate haemotoxic substances which prevent the coagulation of blood and dissolve the red cells. This happens with sclerostomes, larvae of gastrophilia, etc.

I believe, too, that the ankylostoma and sclerostoma secrete also an epitheliotoxin—that is to say, a substance capable of dissolving epithelial cells. Indeed, Looss has found in the intestinal canal of ankylostoma the débris of epithelial cells. I have here under the microscope a preparation which shows a sclerostoma fixed on the wall of the large intestine of a horse. You can see that the oesophagus of the parasite is filled with blood. These are completely disintegrated in the lower part of the intestine, and that is not an exceptional case. Thus, there can be no doubt that the sclerostoma secretes a cytolytic toxin for epithelial cells.

The experiments made with parasites are very interesting; but the objection can always be made that the results obtained are due, not to the action of toxins secreted by the parasite, but especially to those of the products of disintegration of the cells, since they were made with extracts of the parasites. In order to show that the worms secrete a true toxic substance it is indispensable to work, not with an extract but with a parasitic liquid, pure and sterile, and to show that it is harmful for animals belonging to the same species as those infected by the worm. We have been able to carry out this experiment, M. Julien and myself, in carrying out our researches on the *Ascaridae* of the horse. By a special technique of which you may find the details elsewhere,[1] we have recovered the perienteric liquid of *Ascaris megalocephala* in a state of purity and sterility. This liquid has been tried on a carrier of *Ascarida*—that is to say, on a horse. We have been able to show in this way that the instillation of some drops of this liquid into the eye of a horse produces, often at the end of a few minutes, sometimes at the end of half an hour, an intense congestion of the eye, and considerable tumefaction of the eyelids. Although the sensibility of the horse is quite individual, one obtains easily 90 per cent. of positive reactions by injecting 1 c.cm. of ascaridian liquid into the eye of the horse. Sometimes reaction is more general; the horse suffers from dyspnoea, which is very intense, profuse sweat, and even sometimes the symptoms are complicated by severe diarrhoea. These phenomena, although sometimes of a very severe intensity, only last a few hours, the horse being completely recovered the next morning. This toxin of *Ascarida* is very active; some strains are active even when diluted 5,000 times. It is thermostable; the liquid remains active after a sterilization of twenty minutes in the autoclave at 120°. It is very complex, and must in reality represent a union of a series of toxic substances, since we have obtained inflammatory phenomena as well with the alcoholic and ether extracts, etc., as with products obtained by coagulation by heat and by precipitates after treatment with alcoholic ether, etc. The ascaridian liquid is also very toxic for other animals. Thus, it kills a guinea-pig of 200 to 300 grams in a dose of 1 to 3 c.cm. The rabbit is more resistant; one can inject up to 40 to 60 c.cm. without it killing it immediately, but very often it dies of intoxication the next morning or after some time.

Certain authors have affirmed that the ascaridian toxin is very haemolytic. This is not the case. It is sometimes slightly haemolytic, but generally the red cells put in contact with the ascaridian liquid remain intact, even at the end of twenty-four hours in the incubator at 37°. But this liquid certainly acts on the red cells to render them more easily phagocytable. This fact results from some unpublished work done recently in my laboratory by M. de Lintwarer. M. de Lintwarer has discovered in guinea-pigs injected daily with small doses of the perienteric liquid an erythrophagia of high degree. In these animals the spleen and glands hypertrophy and show a considerable quantity of macrophages filled with red cells. This erythrophagia has necessitated the formation of a great number of new macrophages, and one can see in sections of the spleen a multiplication of these elements, in the centre of the lymphatic follicles, easily recognizable by the presence of numerous karyokinetic figures. Thus the ascaridian toxin acts directly, like all other parasitic toxins, on the bone marrow, provoking eosinophilia, but it acts also indirectly on the other centres—namely, the haematopoietic centres, like the spleen and the lymphatic glands, in giving place to the formation of lesions which I have just described.

The horses intoxicated by this ascaridian toxin immunize themselves against this toxin; thus, we have been able to state that the majority of horses infected by a great number of these parasites remain insensible to the local action of the perienteric liquid. This, we believe, is the first example observed of immunity against a verminous toxin.

I have chosen especially the example of an ascaridian toxin, for I have seen published a little time ago a great work on the non-toxicity of this parasite and of certain other parasites. It is, however, very easy to convince oneself of the contrary.

The best proof that the parasites secrete toxins is that the organism absorbs these toxins and elaborates antibodies, of which research permits us to make the diagnosis of helminthiasis. You know what great service to the clinicians the serum diagnosis of echinococcosis renders. Personally I have had occasion to study the serum of more than 450 cases who have been suspected of hydatid cysts, and in 70 to 80 per cent. of these the laboratory diagnosis has been very useful for the doctor treating the case. And these antibodies are to be found in the serum of cases even when they are infected by all other parasites whose toxic actions were not suspected before.

The short time that I have at my disposal does not permit me, unfortunately, to enter more into detail nor to forward certain other experiments of mine. I would only insist upon the result of these new researches, that helminthiasis is, above all, characterized by an intoxication, slight or severe, acute or chronic, produced by the toxic products which the parasite secretes. Since the mouth organs of the parasites or of the larva permits it to fix itself on the intestinal wall, or to penetrate into the internal organs, it produces mechanical lesions as well as functional troubles. In other cases it carries with it microbes which cause an infective disease which can be serious and even mortal. Thus, in helminthiasis as well as in other diseases, complications can ensue which may be more serious than the original disease, which finally it completely masks.

Our helminthological knowledge strives after practical applications. It is indeed very important for a clinician, and, above all, for a clinician working in an area infested by parasites, and especially in tropical countries, to take account of all the clinical symptoms which can be easily explained by the action of worms. It is also important for an investigator to know that many of the parenchymatous lesions, and especially those which are found in the centre of the haematopoietic organs, are not alone due to the action of microbes, but can be produced spontaneously by verminous infection.

REFERENCE.
[1] *Compt. Rend. de la Soc. de Biol.*, T. lxx, p. 337.

DISCUSSION.

Dr. W. F. LAW (British Guiana) said: The question of toxins in helminthiasis is important as throwing light on the pathological appearances and clinical symptoms found in these cases. We have recognized for a long time, from clinical observation, that there must be an active toxin, but as far as I know there has been no scientific proof of its existence, so that Dr. Weinberg's paper is exceptionally valuable. In a paper on ankylostomiasis in the *British Guiana Medical Annual* of 1892 Dr. Ferguson called attention to the pathological appearances seen in ankylostomiasis, laying special stress on: (1) White softening of the brain; (2) a catarrhal and ulcerative condition of the large gut; (3) a delicate cirrhotic change in liver, spleen, and kidneys. Drs. Daniels and Conyers in the same journal for 1895 speak of a fatty change in these organs. All these changes are most probably brought about by the action of the toxin. In the same paper Dr. Daniels draws attention to the presence of haematoidin, and also of a deposit of iron-bearing granules in liver, spleen, and kidneys. These two deposits he looks on as evidence of haemolysis, and are therefore further evidence of the presence of a toxin. Dr. Daniels also calls attention to the fact that one of the taenia produces intense anaemia, though not a blood-sucking parasite. I have myself seen a case of intense anaemia in an otherwise perfectly healthy East Indian, apparently due to the presence of the *Distoma crassum* and *Amphistomum hominis*. Neither of these are blood

feeders, and yet their expulsion resulted in rapid disappearance of the anaemia. A further evidence of toxic action is to be found in the pyrexia so common in ankylostomiasis. This is very frequent, and appears to be due to the presence of a toxin. So that we have strong clinical evidence of the existence of a toxin, and Dr. Weinberg's paper gives us the scientific proof of what we long knew must be the explanation of many symptoms of these diseases. The toxin theory explains the very constant appearance in these cases of intestinal parasites of what we looked on as intercurrent disease, but which may be due directly to the toxin produced.

BLOOD DETERMINATION IN A CASE OF KATAYAMA'S DISEASE.

By Fleet Surgeon BASSETT-SMITH, C.B., R.N.

THE disease in the following case was contracted in June, 1911, near to Hankow, China, in the Yangtse Valley. Early fever was present, some irregularity of bowels followed with progressive anaemia, but there were few other symptoms. On return to England the patient's condition steadily improved, and now, one year after the onset of the disease, he is apparently well.

Blood Observations.

Relative Count.	Polymorpho-nuclears.	Mono-nuclears.	Lympho-cytes.	Eosinophiles.	Basophiles.
Sept. 13th, 1911: White, 12,300	36%	12%	14%	38%	—
Oct. 14th: Red, 4,500,000... ...	29.5	7.5	18.0	45.0	—
White, 16,000... ...	—	—	—	—	—
Nov. 10th: Red, 3,700,000... ...	20.0	4.7	16.5	58.0	—
White, 25,000... ...	—	—	—	—	—
Dec. 14th: Red, 5,200,000... ...	33.0	4.0	16.0	47.0	—
White, 24,000... ...	—	—	—	—	—
Dec. 26th: White, 25,000... ...	20.0	7.0	14.0	59.0	0.5
Jan. 1st, 1912: Red, 4,800,000... ...	19.0	3.0	14.0	64.0	—
White, 28,000... ...	—	—	—	—	—
Jan. 6th: Red, 4,080,000... ...	23.0	3.0	11.0	63.0	—
White, 28,000... ...	—	—	—	—	—
Feb. 13th	26.0	6.0	19.0	49.0	—
Feb. 20th	31.0	8.0	16.0	45.0	—
Feb. 26th: Red, 5,200,000... ...	48.0	2.5	11.0	38.0	—
White, 28,000... ...	—	—	—	—	—
July 16th	—	—	—	30.0	—

The patient is now feeling quite well and has returned to his duty. The characteristic ova were found in small numbers in the stools for seven months.

COPRA ITCH.

By ALDO CASTELLANI, M.D.,

Director, Government Clinic for Tropical Diseases, Colombo, Ceylon.

IN people having to do with copra, handling it, etc., in Ceylon, I have very often observed an extremely pruriginous dermatitis, somewhat resembling scabies. I have observed it both in the coolies and in the European supervisors of labour. The term "copra," as well known, is applied to the dried kernels of the cocoanuts. From fresh cocoanuts the kernels are removed, exposed to the sun for a couple of days; a portion of the kernel crumbles away: this is copra dust. From the kernels cocoanut oil is prepared, and other products.

Clinical Symptoms.—The first impression on seeing a patient suffering from the condition, which from convenience sake I shall call "copra itch," is that he is suffering from scabies. The hands, arms, legs, and sometimes the whole body except the face, present rather large, extremely pruriginous papules frequently covered by small bloody crusts due to scratching; pustules and furuncles may be present. The eruption starts generally on the hands, and from there spreads to the arms, legs, and trunk.

Pustulation, as already stated, may be present, induced by secondary pyogenic infection caused by scratching, and the polymorphic appearance of a scabies eruption, consisting of papule vesicles, excoriations and pustules, may be found. In contrast to true scabies no real burrows or cuniculi are found.

The eruption has in my experience very little tendency to heal spontaneously; I have seen cases in which the eruption has been present for three or four months.

Etiology.—The eruption is in all probability due to a sarcoptes, which, according to the zoologists to whom I have given specimens, is a new species. It is larger than *Sarcoptes scabiei*, and is plainly visible to the naked eye. In some samples of copra dust received from infected mills this sarcoptes was simply swarming, enormous numbers of white minute bodies (the sarcoptes) being visible moving about. This sarcoptes is 1 to 2 mm. in length, has four pairs of legs and several long, stiff, hairlike formations; the male has a well-developed penis. The sarcoptes of copra itch does not appear to bury itself in the skin; it apparently induces the dermatitis in the same manner as *Pediculoides ventricosus* (Newport), which lives in diseased cereals, produces an eruption in people handling such cereals; but further investigation is necessary to settle this point.

Experimental Reproduction of the Disease.—I have made repeated experiments in persons who have volunteered. By rubbing in copra dust not containing sarcoptes no eruption is caused. By rubbing in copra dust containing sarcoptes itching frequently begins very shortly after, and twenty-four to forty-eight hours later an extremely pruriginous papuloid eruption often develops: the same result is obtained by picking out of copra dust the sarcoptes and placing them (alone, without any dust) on the skin underneath a piece of cloth. A few individuals seem to be unaffected by the presence of the sarcoptes or the copra dust containing it.

Diagnosis.—As already stated, the eruption on superficial examination can easily be taken for scabies; true burrows, however, are not present, and the two sarcoptes are morphologically different.

Treatment.—Naphthol and balsam of Peru are, in my experience, very useful in the treatment of the eruption. In adults a 10 to 20 per cent. beta-naphthol ointment may be used, or balsam of Peru and vaseline in equal parts; for women and children the following ointment is very useful, causing very little irritation of the skin: Beta-naphthol, 30 grains; balsam of Peru, 1 drachm; vaseline, 1 oz. The ointment should be applied at night after a hot bath.

NOTE ON THE IMPORTANCE OF HYPHOMYCETES AND OTHER FUNGI IN TROPICAL PATHOLOGY.

By ALDO CASTELLANI, M.D.,

Director, Government Clinic for Tropical Diseases, Colombo, Ceylon.

THE study of bacteria is so engrossing, and has given results of such magnitude, that one is apt, perhaps, to overlook the importance, from a medical point of view, of organisms higher than bacteria—the Hyphomycetes and other orders of fungi.

The investigation of fungi in relation to disease began, as a matter of fact, long before that of bacteria. In 1837 Remak discovered the parasite of favus, which was more completely described by Shönlein in 1839. Between 1841 and 1844 Grüber described the fungi found in thrush and ringworm. Later the great discoveries made in bacteriology overshadowed vegetal parasitology,* though the researches of Böllinger, Blanchard, Manson, Sabouraud, Brumpt, and others have shown the importance of vegetal parasites in the etiology of disease, especially in the

* The term *vegetal parasites* is generally used to indicate parasitic vegetal organisms of higher order than bacteria.

tropics. There is little doubt, in my humble opinion, that further investigation will tend to increase the importance of vegetal organisms higher than bacteria in the same manner that the great medical importance of animal organisms higher than protozoa has already been recognized. In this paper I propose briefly to touch upon some diseases due to fungi which I have observed during my practice in the tropics, and which may possibly be of some practical interest. Vegetal parasites may attack any organ and system of the human body—the integumentary system, as well known, is the most frequently affected, the nervous system the most rarely.

Mycotic Affections of the Nervous System.—In 1904 from the pus of a cerebellar abscess I grew an extremely delicate streptothrix; it was Gram-positive and acid-fast; no club-like formations, as in actinomyces, were present in microscopical preparations. This streptothrix grew comparatively well on sugar media, very slowly and scantily on ordinary agar. On all media the colonies had a black pigmentation. Abscesses of the brain and cerebellum due to true actinomyces have been described by several authors. In cases of general infections due to saccharomyces and endomyces-like fungi abscesses containing such fungi may be found in the brain and spinal cord, as in other organs of the body.

Eyes.—I have seen two cases, in Cingalese children, of a conjunctivitis apparently due to an endomyces; the conjunctiva was highly inflamed, there was photophobia and purulent discharge. The microscopical examination showed, in addition to pus cells, numerous yeast-like bodies. No gonococci or any other bacteria were present. Agar and various sugar-agar tubes were inoculated with the pus, and an endomyces-like fungus was grown. Unfortunately the sugar reactions were not investigated at the time, and the cultures having been lost I am unable to classify this organism. It is to be noted that, not rarely, at least in the tropics, spores of various fungi are found in the slight secretion which so often collects at the angles of the eyes even in normal people, but these spores apparently play only a saprophytic rôle. I have never observed fungus infection of the deeper structures of the eyes, but these have been recorded by several authors. In ulcers of the cornea *Aspergillus fumigatus* (Fresenius) has been found several times (keratomycosis aspergillina).

Rhinomycoses.—Yeast-like and other fungi are often observed in the nasal mucus; they may play only a saprophytic rôle or they may give rise to an inflammation of the mucosa. Recently a little native boy was brought to me by his parents, who stated that he had been suffering for the last three months from repeated attacks of severe sneezing, and that they had observed that on blowing the nose minute black dots were coming out in the mucus. Microscopical and cultural investigations showed this case to be one of aspergillosis due to *A. niger*.

In the literature cases of aspergillosis of the nose due to *A. glaucus* and *A. fumigatus* have also been described.

Otomycoses.—Various fungi may be present in the external auditory canal without causing any symptom. In some cases, however, the fungus multiplies abundantly, and may be the cause of a local inflammation, or apparently may facilitate the formation of wax plugs. In several cases I have found an endomyces, which I have called *End. rhoi*. I have recently been able to study its cultural reactions, and these not having been previously published, I give them here (see Table I).

In two cases of otomycoses I found a fungus belonging to the family Mucoraceae, *Lichteymia ramosa* (Lindt, 1886); it was present in great quantity, and the patient complained of tinnitus aurium and deafness. It is interesting to note that this fungus is found often in the nasal mucus of horses, and both my cases were Tamil muttus (horse-keepers). Various authors (Siebenmann, Böke, Huckel, etc.) have recorded cases due to *Lichteymia corymibfera* (Cohn), *Rhizomucor septatus* (von Bezold); Maggiora and Gradenigo found *Saccharomyces ellipsoides* (Rhees) in a case of chronic otitis media. The same authors found a new species of saccharomyces (*S. roseus*), in the Eustachian tube.

Aspergillomycosis of the ear is comparatively frequent; I have seen several cases in Ceylon, apparently due to *A. fumigatus* (Fresenius). Cramer observed *Aspergillus niger* (von Tiegham); Wreden, *Aspergillus flavus* (Du Bary); Siebenmann, *Aspergillus repens* (Du Bary); and *Aspergillus nidulans* (Eidam). Fungi of the order Basidiomycetes, family Ustilagineae, have also been observed: *Ustilago carbo* and *Tilletia levis*. Of the order Hyphomycetes, *sensu strictu*, *Trichothecium roseum* (Persoon, 1801) has been observed in a few cases.

I may here mention that the best treatment I have found for the various forms of otomycosis is syringing with hydrogen peroxide 2 parts, and alcohol 1 part.

Alimentary System.—Mycotic affections of the tongue (lingua nigra, lingua pilosa) are met with; some pigmented patches are due in some cases to *Oospora lingualis* (Gueguen); in other cases to *Cryptococcus linguae pilosae* (Lucet, 1901); in others to *Rhizopusniger* (Ciaglinski and Hewelke, 1893). Fungi of the genus Actinomyces, as is well known, may attack the organ.

Thrush of the tongue, as well as of the oral mucosa in general, is as common in the tropics as in temporate zones. It is generally stated that it is due to *Endomyces* (*oidium*) *albicans*. It would seem from my researches, the results of which have been published in other journals, that there is in reality a plurality of species of endomyces producing the affection, and that the term *Endomyces albicans* has been used in the past to cover a number of different species.

A very serious disease in which, according to Le Dantec and others, fungi play an important rôle, is sprue. The intestinal hyphomycetic flora of some "sprue" patients is in fact very abundant. The microscopical examination of the frothiest portions of the stools of these patients often reveals numerous yeast-like bodies and mycelial filaments, which can also be seen in the ulcers on the tongue and gums. I have grown six different species, four of which I have investigated more thoroughly, and have called: *End. entericus*, *End. faecalis*, *End. intestinalis*, *End. rotundus*. It is to be noted, however, that three of the species isolated I have observed also in normal individuals, or in persons suffering from other diseases. Table II (p. 1210) shows the sugar reactions of the four species.

The further investigation of the hyphomycetesis in sprue is worth while continuing. Even if, as seems probable, the Le Dantec theory is not correct, these fungi might play a subsidiary etological rôle in producing certain symptoms—for instance, the frothiness of the motions.

It is well known that in certain patients a strong alkaline treatment alleviates some symptoms. I have in my mind the case of a European gentleman suffering from sprue, in whom the attacks of white frothy diarrhoea were greatly ameliorated by using a strong alkaline mixture prescribed for him by Mr. Cantlie, one of the authorities on this disease. This patient never travelled without this mixture.

Possibly the administration of alkalis by reducing the acidity of the intestinal contents, which are generally very acid in sprue, may hinder the growth of the intestinal hyphomycetes, which, as is well known, grow much better in acid rather than in alkaline media.

Mycoses of the Respiratory Organs.—In the tropics bronchial and broncho-alveolar affections, due in all probability to fungi, are of common occurrence. The cases

TABLE I.

	Litmus Milk.	Glucose.	Levulose.	Maltose.	Galactose.	Saccharose.	Lactose.	Mannite.	Dulcite.	Dextrine.	Raffinose.	Arabinose.	Adonite.	Inulin.	Broth.	Peptone Water.	Indol.	Gram.	Gelatine.	Serum.
End. rhoi	A Alk	AG	AG	AS	AGS	AG	0	0	0	0	0	0	0	0	C	C	0	+	0	0

TABLE II.

	Litmus Milk.	Glucose.	Levulose.	Maltose.	Galactose.	Saccharose.	Lactose.	Mannite.	Dulcite.	Dextrine.	Raffinose.	Arabinose.	Adonite.	Inulin.	Broth.	Peptone Water.	Indol.	Gram.	Gelatine.	Serum.
End. entericus	Alk	AG	AG	AG	AG	AG	0	A	0	A	0	0	0	0	C	C	0	+	0	0
End. faecalis	A DP	AG	AG	AG	AGS	AGS	0	0	0	0	0	0	0	0	C	C	0	+	0	0
End. intestinalis	AD	AG	AG	AS	A	A	0	0	0	0	0	0	0	0	C	C	0	+	0	0
End. rotundus	AC	A	A	A	A	0	A	0	0	0	0	0	0	0	C	C	0	+	0	0

A, acid; Alk, alkaline; G, gas; C, clot (milk), clear (broth and peptone water); D, decolorized; P, peptonized; S, slight; 0, negative result.

of bronchomycosis I have observed in Ceylon may, according to the fungi found, be classed as follows:

1. Cases of brocho-endomycosis (broncho-oidiosis) due to fungi of the genus Endomyces (oidium).
2. Cases of broncho-aspergillosis and penicilliosis due to aspergilli and penicilli.
3. Cases of broncho-streptotrichosis and broncho-actinomycosis due to the fungi of the genus Streptothrix and Actinomyces.
4. Cases of broncho-mucormycoses due to fungi of the family Mucoraceae, such as *Rhizomucor parasiticus* (Lucet and Costantin), and *Lichtheymia corymbifera* (Cohn).

I should like here to say a few words on what is called in Ceylon "tea-factory cough." Coolies working in tea factories are often observed to deteriorate in their general health, losing flesh and becoming easily tired; at the same time they develop a cough with muco-purulent expectoration. The physical examination of the chest reveals nothing—except occasionally a few coarse râles. If these coolies are taken away from the factory and sent to work in the fields, all the symptoms slowly disappear.

A similar affection I have occasionally observed in tea-tasters. Tea-tasters, in order to judge of the quality of teas, not only taste infusions, but frequently fill their hands with tea-leaves and bury for a moment their noses in it, snuffing it up: in this way a certain amount of tea dust enters their nasal cavities, and with the tea dust the micro-organisms which are found in it. I have examined a number of samples of tea and tea dust, and the micro-organisms present, as a rule, in Ceylon are:

1. Fungi of the genus Endomyces—constantly.
2. Fungi of the genus Aspergillus and Penicillium—frequently.
3. A peculiar streptococcus different from *S. pyogenes*—frequently.

All or some of these organisms may be found also in the nasal cavities of tea-tasters, and in the expectoration of people suffering from so-called "tea-factory cough."

For eleven months I insufflated every day into the nostrils of a guinea-pig samples of tea and tea-dust; when the guinea-pig died the examination of the lungs showed a broncho-alveolitis; microscopically, in smears and sections of the lungs, numerous round yeast-like cells were present, and culturally an endomyces fungus was grown.

Table III contains the commonest species of endomyces which I have isolated from sputum in cases of bronchial affections in Ceylon; probably many of these species play only a saprophytic rôle, but two at least—*End. tropicalis* and *End. paratropicalis*—are, according to my experiments, pathogenic.

Mycoses of the Genito-urinary Organs.—Several authors have put on record cases of urethritis with black discharge due to *Aspergillus niger* (von Tiegham, 1867). An old Tamil coolie came some years ago to the clinic, complaining of black urethral discharge dating from several months back; he stated that he had not had sexual contact for several years. The discharge was purulent and presented numerous black granules; a few cocci were present, but no gonococci. The granules consisted, under microscopical examination, of numerous mycelial threads and spore-like bodies. Various sugar media were inoculated and a fungus was grown, producing a black pigmentation. The cultural characters were very similar to those of the fungus found in tinea nigra—namely, *Foxia mansoni*.

Thrush-like affections of the vagina are not rare. In a little Cingalese boy 5 or 6 years old I saw a thrush-like condition of the glans penis due to an endomyces.

Aspergillosis and *penicilliosis* of the vulva and vagina are occasionally met with. Actinomycosis and sporotrichosis of the genital organs, male and female, as well as occasionally of the kidneys and bladder, may occur.

Mycoses of the Skin.—Diseases of the skin and hair due to vegetal parasites are extremely common in the tropics. Some of the fungi found are the same as those observed in

TABLE III.

	Litmus Milk.	Glucose.	Levulose.	Maltose.	Galactose.	Saccharose.	Lactose.	Mannite.	Dulcite.	Dextrine.	Raffinose.	Arabinose.	Adonite.	Inulin.	Sorbite.	Broth.	Peptone Water.	Indol.	Gram.	Gelatine.	Serum.
End. albicans (Robin)	AC	AG	AGS	AGS	AG	Av. S	0	0	0	0	0	0	0	0	0	CTP	C	0	+	+	+ S
End. tropicalis (Castellani)...	A	AG	AG	AG	AGS	AGS	0	0	0	0	0	0	0	0	0	C	C	0	+	0	0B
End. paratropicalis (Castellani)	A Alk	AG	AG	AG	AG	AG	0	0	0	Av. S	0	0	0	0	0	CTP	C	0	+	0	0
End. pinoyi (Castellani)	0	AG	AG	AG	0	0	0	0	0	0	0	0	0	0	0	C	C	0	+	0	0
End. bronchialis (Castellani)	0	AG	AG	AG	0	AGS	0	0	0	A	0	0	0	0	0	C	C	0	+	0	0
End. guillermondi (Castellani)	Alk	AG	AG	AS	A	AG	0	0	0	0	AGS	0	0	0	0	CTP	C	0	+	0	0
End. negrii (Castellani)	AS Alk	AG	AG	AS	AGS	AG	0	0	0	0	AGS	0	0	0	0	C	C	0	+	0	0
End. niveus (Castellani)	Alk	AG	AG	AG	AG	AGS	0	0	0	0	AG	0	0	0	0	C	C	0	+	0	0
End. nitidus (Castellani)	A DC	AG	AG	A	A	A	A	A	0	AS	0	0	0	0	0	CTP	C	0	+	0	0
End. pseudotropicalis (Castellani) ...	AC	AG	AG	0	AGS	AG	AG	0	0	0	0	0	0	0	0	C	C	0	+	0	0
End. insolitus (Castellani)...	AS Alk	AG	AG	AG	AG	AG	0	AS	0	0	0	0	0	0	0	C	C	0	+	0	0B
End. rugosus (Castellani)	ACS	A	A	A	A	A	0	0	0	0	0	0	0	0	0	C	C	0	+	0	0
End. krusei (Castellani)	0	AG	AG	0	0	0	0	0	0	0	0	0	0	0	0	C	C	0	+	0	0

A, acid; C, clot (milk); C, clear (broth and peptone water); D, decolorized; P, peptonized (milk); TP, thin pellicle (broth); Alk, alkaline; A Alk, acid, then alkaline; S, slight; B, black or brown colour taken by the medium; 0, negative result—namely, neither acid, nor clot in milk, neither acid nor gas in sugar media, non-production of indol, non-liquefaction of gelatine or serum, as the case may be.

temperate zones, others are peculiar to the tropics; it is to be noted, however, that, owing to the enormous increase in traffic and intercourse between tropical countries and Europe, fungi which were considered to be strictly tropical have spread to countries situated in temperate zones. I have been asked by several persons interested in the subject to reprint a small table I published some years ago with the classification of tropical dermatomycoses, quoted also in the manual written by Dr. Chalmers and myself, and to bring it up to date. Tropical dermatomycoses may be classified as follows:

Tropical Dermatomycoses.

Genera.	Species.	Condition Caused.
I.—Due to fungi of the genera Saccharomyces, Cryptococcus (Kitzing), Zymonema (Splendore)	*S. gilchristi* (Vuillemin) and other species	Blastomycosis.
II.—Due to fungi of the genus Sporotrichum (Link, 1809)	*S. beurmanni* (Matruchot and Ramond, 1908); *S. asteroides* (Splendore, 1910): *S. indicum* (Castellani, 1908)	Sporotrichosis.
III.—Due to fungi of the genus Pityrosporum (Sabouraud, 1895)	*P. cantliei* (Castellani, 1898)	Tropical seborrhoea of children.
IV.—Due to fungi of the genus Hemispora (Vuillemin, 1906)	*H. stellata* (Vuillemin, 1906)	Hemisporosis.
V.—Due to fungi of the genera Aspergillus (Micheli, 1727) and Penicillium (Link, 1809)	*A. barbae* (Castellani)	Aspergillosis of hairy parts.
	P. barbae (Castellani)	Penicilliosis of hairy parts.
VI.—Due to fungi of the genera Aspergillus (Micheli, 1725); Penicillium (Link, 1809); Monilia (Parsoon, 1801); Montoyella (Castellani, 1907)	—	Pinta.
VII.—Due to fungi of the genus Trichosporum (Behrend, 1890)	*Tr. giganteum* (Behrend)	Piedra.
VIII.—Due to fungi of the genera Discomyces Rivolta, 1870); Madurella (Brumpt, 1905); Indiella (Brumpt, 1905); Aspergillus (Micheli, 1725); Oospora	–	Madura foot.
IX.—Due to fungi of the genus Malassezia (Baillon, 1889)	*M. tropica* (Castellani)	Tinea flava.
X.—Due to fungi of the genus Microsporoides (Neveu Lemaire, 1906)	*M. minutissimus* (Burchardt)	Erythrasma.
XI.—Due to fungi of the genus Foxia (Castellani, 1908)	*Foxia mansoni* (Castellani)	Tinea nigra.
XII.—Due to fungi of the genus Epidermophyton (Sabouraud, 1907) and Trichophyton (Malmsten, 1845)	*Ep. cruris* (Castellani); *Ep. perneti* (Castellani); *Ep. rubrum* (Castellani); *Tr. nodoformans* (Castellani)	Dhobi itch.
XIII.—Due to fungi of the genus Trichophyton (Malmsten, 1845)	*Tr. albiscicans* (Nieuwenhuis)	Tinea albigena.
	Tr. blanchardi (Castellani)	Tinea Sabouraudi.
XIV.—Due to fungi of the genus Endodermophyton (Castellani, 1908)	*End. concentricum* (Blanchard); *End. indicum* (Castellani)	Tinea imbricata.
	End. castellanii (Perry)	Tinea intersecta.

Of the above dermatomycoses I may, perhaps, be allowed to say a few words regarding the etiology of three which I have constantly investigated during recent years:

1. Dhobie itch.
2. Tinea flava et nigra.
3. Tinea imbricata.

Dhobie itch—or tinea cruris, to use the term introduced by Macleod—has been known to tropical practitioners for many years, and Manson and others had found out that it was due to trichophyton-like fungi. In 1905 I suggested that it should be separated from the ordinary forms of tinea corporis, and I stated that the fungi found in it were different from the trichophytons found in the European ringworm. I named the fungus most frequently found in Ceylon cases *Tinea cruris*. In 1907 Sabouraud in a masterly manner investigated the condition in Europe, which he called tinea inguinalis, and the fungus, *E. inguinalis*. There is no doubt that the condition described by Sabouraud under the term "tinea inguinalis," and many years previously by Hebra with the term "eczema marginatum," is the "dhobie itch" of tropical authors.

Dr. Sabouraud, who has kindly examined my cultures, has come to the conclusion that the fungus *Tr. cruris* found in most of the cases in Ceylon, is identical with the fungus which he called *E. inguinalis* found by him in France. I would take this opportunity, however, to emphasize the fact that dhobie itch, at least in the tropics, is not due to a single fungus but to several different species, each of which gives rise to a slightly different clinical variety of the disease. Up to now I have found in Ceylon four different fungi:

1. *Epidermophyton cruris* (Castellani, 1905), syn. *Ep. inguinalis* (Sabouraud, 1907), *Tr. castellanii* (Brook, 1908).
2. *Ep. perneti* (Castellani, 1907).
3. *Ep. rubrum* (Castellani, 1909), syn. *Ep. purpureum* (Bang, 1911).
4. *Tr. nodoformans* (Castellani, 1911).

Ep. cruris grows on maltose agar very slowly—colonies orbicular-shaped or acuminated of a yellowish colour, later white. It has no pyogenic properties, and does not invade the hair follicles. It is the cause of the most usual type of dhobie itch, so well known to every tropical practitioner, with the festooned red patches on the inside of the thighs and elevated margin.

Ep. perneti was first described by Pernet; it is similar to *Tr. cruris*, but the growth is much quicker and the cultures at first have a delicate pinkish colour. It is rare, at least in Ceylon, and the type of dhobie itch caused by it is practically identical to that produced by *Ep. cruris*.

Ep. rubrum.—This fungus is characterized by the beautiful deep red pigmentation in Sabouraud and glucose agar. It has so far been found in Ceylon by me and in Europe by Bang and Sabouraud. It produces a kind of dhobie itch having a great tendency to spread from the groins and axillae—the usual seats of the eruption—to other parts of the body. The affected parts often present from the very beginning an eczematoid appearance.

Tr. nodoformans is characterized by the peculiar brick-red colour of the cultures in Sabouraud agar; this colour is lost in subcultures. It is the cause of a peculiar type of dhobie itch, characterized by the presence of deep nodules along the edge of the eruption. It may attack the hair follicles and spread to various parts of the body. Dr. Chalmers and myself saw once a case presenting a nodular eruption due to this fungus in the groins, and at the same time presenting a patch of sycosis due to the same organism on the right cheek.

Tinea flava.—I venture to touch on this dermatomycosis as by most writers it is still confused with the ordinary pityriasis versicolor. The disease is characterized by yellow patches on various parts of the body, the parts affected in order of frequency being the face, neck, chest, and abdomen. The fungus is a malassezia—*M. tropica* (Castellani, 1905)—which, microscopically, is hardly distinguishable from *M. versicolor* of pityriasis versicolor. The usual pityriasis versicolor, as found in temperate zones, is not of so light a colour as *T. flava*, never attacks the face, and is easily curable.

Tinea nigra.—I mention this disease, as, apparently, judging from the literature, it appears to be very little known. It was first decribed by Manson in 1872 in China, but his observations were forgotten, as they were not quoted by him in his subsequent publications. I redescribed it in Ceylon in 1905. It is characterized by the presence of black patches due to a fungus, which I called *Foxia mansoni*. This fungus grows well in all media, its colonies being of a jet black colour. It may attack Europeans: a distinguished member of our profession developed a small patch on the palm of the left hand after a trip to Burma.

Tinea imbricata.—The etiology of this disease has been the subject of numerous controversies. Manson first in 1872 described a trichophyton-like organism in the squammae; with the laboratory technique of that time attempts at cultivation could not be carried out. Blanchard

considered it non-cultivable, and called it *Tr. concentricum;* on the other hand, Nieuwenhuis stated that it was quite easily cultivated, and was characterized by the crateriform shape of its colonies. Nieuwenhuis's experiments were not confirmed. In recent years the general opinion—especially among Continental authors—was that aspergilli-like fungi were the cause of the disease. Tribondeau described fructifications somewhat similar to those of an aspergillus, and created for the fungus the genus *Lepidophyton*. Wehmer describes it as a true aspergillus, and calls it *A. tokelau*.

From the results of the investigations I have carried out in Ceylon, which I have published elsewhere,[1] I think I am justified in stating that aspergilli and aspergillus-like fungi have nothing to do with the disease; and when they are found in the squammae they are saprophytes or contaminations. For the fungi which, according to my researches, are the true cause of tinea imbricata I have established the genus *Endodermophyton*, of which I have found two species in Ceylon cases—*End. concentricum* and *End. indicum*.

To grow these fungi from the scales it is necessary to use a certain technique, the particulars of which I have given in previous publications; once grown, however, subcultures are easily obtained.

End. concentricum on glucose agar (4 per cent.) shows a growth with cerebriform or crinkled surface. The growth and the medium show a slight amber colour, which later may become of much deeper hue. Duvet generally absent.

End. indicum, on the same medium, shows a growth with surface somewhat convoluted or furrowed; a portion of the growth, often the central, is of a deep orange, red-orange, or pink-orange colour, the rest of the growth appearing white and powdery, being covered by a very short, delicate duvet.

I venture to say that the above two fungi are the real etiological agents of tinea imbricata in Ceylon, as by inoculating cultures of either I have reproduced the disease, typically, in human beings.

I end this note with the hope that I may be excused for its somewhat sketchy nature. My intention has been to show the importance of fungi in tropical pathology by touching, without any prearranged order, on some of the various mycoses of which I have had personal experience in tropical countries. I should be glad if this modest note should in any way stimulate research on vegetable parasitology in relation to disease.

REFERENCE.

[1] *Journal of Tropical Medicine*, 1911.

ON THE TREATMENT OF ELEPHANTIASIS OF THE LEGS BY LYMPHANGIOPLASTY.

BY

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I. CLINICAL OBSERVATIONS.

MANY attempts have been made of recent years to devise a satisfactory method of dealing with elephantiasis of the legs; but, it must be admitted, the results of most of the new procedures have hitherto failed to confirm the expectations of their originators.

The most hopeful and, at the same time, the most rational and practical of the proposed methods appeared to be that first advocated by Mr. W. Sampson Handley in the *Lancet* of January 2nd, 1909, in a paper entitled "A Prospective Cure of Elephantiasis by the Operation of Lymphangioplasty." Mr. Handley elaborated his thesis and described his procedure in more detail in his Hunterian Lectures on the Surgery of the Lymphatic System, reported *in extenso* in the BRITISH MEDICAL JOURNAL of April 9th, 1910.

Enjoying rather exceptional opportunities for repeating Mr. Handley's experiments, we wish to record our experience of a short series of cases, which have yielded interesting but, on the whole, uniformly disappointing results. In effect, we have found that so long as the patient is kept absolutely recumbent after his operation the results are apparently most flattering; but as soon as he begins to be up and about the swelling rapidly returns, and in a short time the leg is just as swollen as it was before the operation. It does not matter how long rest is enforced, the result is the same once the action of gravity comes into play.

Mr. Handley, in his summary of the results of the operation, writes: "To my mind lymphangioplasty has failed to establish its position in the treatment of elephantiasis." And again: "It would appear that in the lower extremity, as contrasted, for instance, with the arm, the strenuous opposition of gravity nullifies the effects of the operation as soon as the limb is allowed to hang down for even a short period daily. The operation, indeed, *does* supply the channels which are missing, but, as I have already insisted, it does not provide a motive force. It is unable to fight against the full vertical pressure of gravity in the lower limb."

While our clinical results are entirely in accord with these statements, our findings in and around threads, taken from the limbs two or three weeks after lymphangioplasty, and in others experimentally introduced into the subcutaneous tissues of guinea-pigs, appear to show that, quite apart from the action of gravity, the artificial lymph channels do not persist for any length of time; and that there is finally an obstruction to lymph return from the obliteration of lymphatics in the neighbourhood of the inserted thread. In all our cases Mr. Handley's technique has been carefully followed. The legs were prepared for a week before operation by painting them daily with a 2 per cent. solution of iodine in rectified spirit, after removing any specially thick skin by the application of salicylic acid and resorcin ointment. The patient was kept at rest during this time with the leg well bandaged over a mass of wool from the toes to the groins. The threads were introduced and ran up the inner side of the leg from the instep well on to the abdominal wall, and sometimes a second set were introduced on the outer side.

Record of Cases.

CASE I.

Yussef-el-Nahas, a young Egyptian fiki-preacher, aged 25, was admitted to Kasr-el-Ainy hospital from Faraskour, Lower Egypt, on April 26th, 1910, with well-marked elephantiasis of the right leg, which had started a year before, and had gradually increased with recurrent attacks of fever and swelling. *Filaria nocturna* were found in the blood. The foot and lower part of the thigh were much swollen and covered with rough thickened skin. After the usual preparation lymphangioplasty was performed on May 14th under stovaine anaesthesia. At the first dressing four days later the skin lay in folds and all the measurements of the limb had very considerably diminished and so remained till June 6th, 1910, when the patient was discharged. He was seen fifteen days later in the out-patient department, and the leg was just as swollen as before operation, if anything rather more so, especially on the dorsum of the foot.

CASE II.

Ahmed Mohammed Foada, aged 70, an Egyptian boatman from Damietta—one of the principal centres of elephantiasis in Egypt—was admitted on April 26th, 1910. Advanced elephantiasis left leg. Rapid onset and increase since first attack of fever six months ago. Some lymphangiectases below and varicose groin glands. No filaria found. Lymphangioplasty, May 14th; discharged sixteen days later, practically no swelling. Seen in out-patient department after a fortnight, swelling as bad as before, but skin more supple and not so thickened.

CASE III.

Charib-el-Sayed, an Egyptian fellah, from Giza near Cairo, aged 18. Admitted June 23rd, 1910. Elephantiasis of left foot and calf. Filaria absent. Operation July 2nd, followed by expected improvement which persisted till his discharge. He did not return to out-patient department, and could not be traced.

CASE IV.

Mohammed Ismail Khalil, an Egyptian pedlar, aged 22, from Boulac, Cairo. Admitted July 3rd, 1910. Had an inguinal abscess opened five years before and repeated attacks of fever and pain and an ever-increasing swelling in the left leg. No filaria found. Operation July 9th. Circumference of foot 26 cm., reduced after operation to 25.9 cm.: of calf 42.6 cm., reduced to 35.2 cm.; of knee-joint 44.4 cm., reduced to 39.4 cm.; and of thigh 48.2 cm., reduced to 42.5 cm. Seen in the out-patient department five weeks after operation, all the old measurements had returned and were even exceeded.

Case v.

Mohammed Aly-el-Ashairy, an Egyptian café-keeper, aged 25, from Embabeh, near Cairo. Admitted August 2nd, 1910. Marked elephantiasis of the left leg, said to have followed a wound from a bit of glass on the sole of the foot. No filaria. Operation a week later and reduction of all measurements by 5 cm., but a month later, in the out-patient department, all his swelling had returned.

Case vi.

Mohammed Farag, an Egyptian clerk, living in Cairo, aged 32. Admitted October 6th, 1910, with two years' history of elephantiasis of the whole of the left lower extremity. No filaria. Operation and results precisely similar to other cases.

Case vii.

Hassan Ahmed El-Sakka, an Egyptian boy of 15. Admitted October 28th, 1910. Elephantiasis of right foot and leg. No filaria. After operation perfect result for ten days, when the boy got out of bed and walked a little. Almost immediate return of the swelling, which disappeared rapidly after the insertion of a second series of threads on the outer side. While still free from swelling, a strip of skin 17 cm. long by 3.3 cm. wide was excised from the middle of the calf and a narrower strip from the front of the ankle. The swelling slowly returned as soon as the boy began to walk, and but little ultimate benefit resulted.

Case viii.

Mohammed Mikhawi Suleiman, an Egyptian fellah, aged 25, from Bibeh, Upper Egypt. Admitted November 26th, 1910. Swollen left leg since an incision into a plague bubo in the left groin eighteen months ago. Swelling confined to the thigh and not like a true elephantiasis. Improved rapidly after operation, and, up to the time he was lost sight of, appeared to be more likely to derive permanent benefit from the lymphangioplasty than any of the other cases.

Many other cases could be quoted, but in all the swelling was temporarily reduced within a few days of the operation, but returned and persisted even after the first day's walking.

Our best thanks are due to Dr. Tewfik Omar, resident surgical officer, for the care he has taken in the preparation of these cases for operation and for his skilful after-treatment.

II. The Conditions after Lymphangioplasty in a Healthy Patient.

To examine the condition of threads introduced into healthy tissues, the operation of lymphangioplasty was performed on a patient with a healthy limb by Dr. Aly Ibrahim; and twenty-one days later a block of tissue containing a portion of the thread and the surrounding tissues was cut out and examined. The piece of tissue was embedded in celloidin and sections cut out and stained by Professor A. R. Ferguson, who reports as follows:

The thread is seen in both longitudinal and transverse directions, more particularly in the former, the fibrils of the thread are slightly separated, and between them leucocytes have made their way from their margins inwards. Peripherally the thread is closely invested by an extremely cellular tissue in which are set considerable numbers of active phagocytes (giant cells). Some of them are pointing directly inwards towards the frayed-out margins of the thread. The tissue in which the giant cells lie is composed of young connective tissue corpuscles, and is crowded with polynucleated leucocytes. A few newly-formed blood capillaries occur in this tissue also. Externally to this layer is a well-defined concentric zone of comparatively dense fibrous tissue, which gradually merges into the surrounding fibro-adipose subcutaneous tissues. The few lymphatic channels seen in the neighbourhood of the smaller arteries of this region are the seat of a lymphangitis, as indicated by a leucocytic infiltration in and around their walls, of the same nature as that noted above at the site of the thread. From the dense tissue and apparently progressive nature of the reaction which has taken place round the introduced thread, it does not appear probable that anything of the nature of a lymphatic channel sufficient to maintain a permanent drainage of lymph from the surrounding tissues into the canal round the thread could occur.

III. Condition of Thread and Surrounding Tissues after Lymphangioplasty for Elephantiasis.

Our next experiment was to cut out a thread which had been inserted in the course of the operation of lymphangioplasty on a patient with elephantiasis of the leg. The line of the thread was marked at the time of the operation, and twenty-one days later a piece of tissue, 1 in. in length, consisting of skin, subcutaneous tissue, and the thread, was removed *en bloc* and examined. It was seen at once that the thread, apparently quite unaltered, slid up and down in a thick-walled canal of fibrous tissue, and was only with difficulty retained in its place in the section. Microscopical sections were cut with some difficulty owing to the looseness of the thread, and showed the following appearances. Professor Ferguson again reports:

When this piece of tissue was removed the thread, although *in situ*, was very loose, and during the preparation of sections, cut from celloidin blocks, has unfortunately dropped out. The section, therefore, shows a well-defined space surrounded by a cellular tissue, having essentially the same features as that described as existing round the thread in healthy tissue. The cellular reaction in degree, however, is much less, and the numbers of the giant cells in particular are much reduced. The surrounding lymphatics of the district are marked by collections of lymphatics; but in a considerable number of sections examined no traces of these cells were found entering into the walls of the channel left by the thread; and it is highly probable that with the further development of fibrous tissue immediately around the site of the thread any already existing lymph channels in this area would be obliterated by pressure.

The vessels in this tissue, and particularly the medium-sized arteries, are the seat of chronic sclerotic changes especially met with in the new formations of elephantiasis.

IV. Experimental Lymphangioplasty in Healthy Guinea-pigs.

To further determine the fate of buried silk threads in the subcutaneous tissues the operation of lymphangioplasty was performed by Dr. Aly Ibraham on a series of guinea-pigs, and the sections of threads and surrounding tissues subsequently examined by Dr. Anis Onsy. The details of technique were approved by Professor W. H. Wilson, Professor of Physiology, and the preparation and examination of the specimens controlled by Professor A. R. Ferguson, Professor of Pathology.

With the strictest aseptic precautions, a thread of No. 3 silk was introduced under the skin, and ran from the lower part of the abdomen through the subcutaneous tissues of the thorax into the axilla in each instance. Five hours before each animal was killed a small quantity of diluted Chinese ink was injected into the immediate neighbourhood of the distal end of the thread to test the permeability of the surrounding lymphatics. The axillary glands were subsequently dissected out, and were invariably found to contain black pigment granules in their substance.

After the animals had been killed, a length of tissue containing the thread was dissected out, and fixed in a 10 per cent. watery solution of formalin. The specimen was gradually dehydrated in alcohol, and then embedded in paraffin, whence sections were cut and examined microscopically.

The first guinea-pig was killed *two days* after the lymphangioplasty, and it was evident that very little change had occurred in the tissues along the track of the silk. The pigment granules were thickly massed around the thread, and became fewer and fewer from this centre outwards to the periphery of the section.

At the end of *four days* the second animal was examined, and now a cellular infiltration had begun in the immediate neighbourhood of the thread. This consisted mainly of a mass of round and polymorphonuclear cells. Small thin-walled, obviously newly formed, blood vessels had made their appearance, and the granules of pigment could still be seen lying in close contact with the thread. The third animal was examined *six days* after the operation, and considerable changes were apparent in the tissues. The thread was now surrounded by thin-walled blood vessels lying in a richly cellular infiltration, in which the polymorphonuclear cells were much less numerous than in the former section. The lymph spaces at the periphery only were black with pigment granules (Fig. 3). *Twelve days* after operation the fourth animal was killed, and at once it was remarked that an extensive fibro-cellular reaction had occurred, which had obliterated the pre-existing lymph spaces in the immediate neighbourhood of the thread. New vessel formation was very active, and there was no sign of pigment about the track of the thread.

From the animal examined after *fifteen days* the section showed that the thread was completely enveloped in a thick mass of fibro-cellular tissue containing but few blood vessels and with very little cell infiltration beyond it. New connective tissue corpuscles of spindle shape were numerous, and there was no deposit of pigment for some distance round the thread, owing to the blocking of lymphatic spaces by the progressive development of fibrous tissue.

In the specimen removed from the animal *a month* after the operation the fibrous tissue encapsuling the thread was relatively thin and laminated, and contained many spindle-shaped cells. Trabeculae of connective tissue were seen passing inwards into the thread, and breaking it up into strands. These trabeculae contained numerous new blood vessels. The individual strands of the silk were enveloped in a dense cellular infiltration consisting mainly of round cells, and there was also some surrounding haemorrhage.

It is to be specially remarked that up to the sixth day after operation the pigment granules were most numerous around the thread, showing that the original lymphatics still persisted up to this stage. After six days and up to a month the granules were found only at the periphery and were entirely absent from the neighbourhood of the thread, which certainly seems to

indicate that the lymphatic circulation along the course of the artificial lymphatic—the thread—becomes gradually blocked and finally ceases about fourteen days after the operation.

Conclusions.

1. Clinically, it is abundantly evident that lymphangioplasty fails to effect anything but a very temporary improvement in elephantiasis of the legs. The swelling is very markedly reduced within forty-eight hours after the operation; but the improvement persists only so long as the recumbent position is maintained. Within at most twenty-one days after the operation, or as soon as the patient begins to walk, the swelling invariably returns and no permanent improvement results.

2. The examination of the tissues surrounding threads introduced during the operation of lymphangioplasty in cases of elephantiasis, and also around threads introduced into healthy tissues of man and of guinea-pigs, supplies very adequate reasons for the failure of the operation.

Important as the action of gravity may be in contributing to the failure to maintain a new artificial lymphatic circulation, it appears that this want of success is due in far greater degree to definite reactive changes in the tissues immediately around the thread, which soon isolate the new lymph tube from the surrounding lymphatic areas and eventually completely obliterate it.

Briefly the series of changes in the tissues around buried longitudinal threads in the subcutaneous tissues are as follows:

1. For a short time the threads, by virtue of their capillary action, drain the surrounding tissues of the lymph contained in them.

2. The threads in the tissues soon excite a definite cellular reaction, which leads comparatively soon—from fourteen to twenty-one days—to the formation of a dense and progressively contracting fibrous tissue. This walls off the thread and crushes the adjacent lymphatics out of existence, and thus effectually prevents any absorption of fluid into the space immediately around the thread itself. These fibrous changes, occurring around the ends of the thread, as well as along its whole length, eventually completely isolate it, and it may then perhaps be compared to a long worm lying within an impermeable sheath.

3. The thread is later penetrated by rows of cells, running in along its fibrils, which must eventually lead to its complete disintegration; and the formation of a solid column of dense fibrous tissue along which no absorption of fluid of any kind can possibly occur.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

CASE OF LOCKED TWINS.

I record this case on account of the extreme rarity of locked twins. Professor Munro Kerr writes: "According to v. Braun it only occurred once in 90,000 cases in the two Vienna cliniques."

On August 24th, 1912, I was called to a woman (Zulu) who had been in labour three days in a kraal, in an inaccessible part of Alexandra County.

I found her lying in the hut. She was somewhat blanched. The pulse was scarcely perceptible, but there was no sign of much blood. The abdomen was very protuberant and extremely hard. Pains had evidently stopped and the uterus was in a state of tonic contraction. A cord was prolapsed, hanging quite a foot from the vulva, and the feet of a child seen on slightly separating the labia. The cord was greenish, with a putrid smell. A diagnosis of twins was almost immediately apparent, and it certainly crossed my mind that they might be locked. I pulled the legs, but that was sufficient only to stretch the body; the head was stuck.

I put in a hand and found the neck, as I thought, elongated. It was certainly slightly twisted. There was a second head, evidently fore-coming, wedged into the hollow of the neck on the left side. I could feel the head belonging to the breech-presenting child above this. There was no doubt at all now of the condition. As far as I could feel, the diagram in Dr. Munro Kerr's book (after Bumm) exactly illustrates the condition.

I tried to push up the second (fore-coming) head, but could not; I had no one to give an anaesthetic. I then decapitated the breech-presenting baby. The state of the cord showed it was already dead. The head of the second immediately came forward into the pelvis. I had some little difficulty in putting on the forceps but eventually delivered a living child, with the cord twisted spirally round neck and back. The first head afterwards immediately presented by the severed neck. I easily removed it between finger and thumb, using no force whatever. There was no excessive loss of blood.

Both placentae were adherent, and I had to remove them manually. The lower was low down on the left of the cervix. I suspect that the pressure of the second head might probably have prevented it bleeding. The upper was up towards the fundus. They were joined together by a membrane about 2½ to 3 in. across, otherwise they appeared to be quite distinct. Both the mother and child were alive and apparently going on well a week afterwards. I was afraid of sepsis after so much handling, and when one thinks of working in a Zulu hut in semi-darkness on the floor, with no help whatever (I could not even speak the language) it must be that from their surroundings, Zulu women have gained a certain amount of immunity from septicaemia, etc.

The woman was a primipara, married five years without any children. Her husband had died some time previously and probably was not the father of these children. She was at full time and the children were large and well nourished. The friends who came in a week later said that the child was "large and strong."

She had come to the surgery (20 miles away) previously, saying she was three months pregnant. I diagnosed it as four months, but did not discover twins.

I think the above treatment advised by Dr. Munro Kerr in his book is the best, inasmuch as a young practitioner under difficult circumstances was able, without very great difficulty, to deliver a living child, without, apparently, undue damage to the mother.

Ian Macdonald, M.B., Ch.B.Glasg.,
Deputy District Surgeon, Deputy Health Officer, Alexandra County, Natal.

GLACIAL ACETIC ACID IN PSORIASIS.

It is a common occurrence for men in all lines of medical practice to come across cases of psoriasis either directly or concurrently with some other trouble. All are agreed as to the chronicity of the disease and also as to its intractability to treatment, notwithstanding the many methods which are in vogue with a view to terminating the trouble. The case which came under my observation was that of a seafaring man who had been troubled with psoriasis for many years incessantly; it presented a light, silver, scaly aspect, which had persisted on the extensor surfaces and had resisted all methods of treatment. Local treatment by glacial acetic acid proved successful within a week or two. Considerable time has now elapsed since the treatment was used and there has been no return of the affection. This is the first time the patient has been free from the scales since he began to be troubled many years ago. There was a certain amount of smarting following the application of the acid but it was not severe.

Whalley Range, Manchester. G. T. Cregan, M.B., Ch.B.

The late Dr. Reginald Edward Thompson, for some years consulting physician to the Brompton Hospital for Consumption, left estate of the gross value of £7,195, of which the net personalty has been sworn at £7,058.

The next meeting of the German Congress of Internal Medicine will be held at Wiesbaden in April, 1913 (15th to 18th). The principal question proposed for discussion is the nature and treatment of fever.

The number of medical students in the several universities of Austria on May 31st of the present year were as follows: Vienna, 2,183, of whom 128 were women; Graz, 453, of whom 12 were women; Innsbrück, 244, of whom 4 were women; Prague (German University), 414, of whom 19 were women; Prague (Czech University), 764, of whom 28 were women; Cracow, 431.

Reports of Societies.

ROYAL SOCIETY OF MEDICINE.

Section of Diseases of Children.

Friday, October 25th, 1912.

Mr. A. H. Tubby, President, in the Chair.

Precocious Development.

Dr. E. C. Williams described a case of precocious development in a boy aged 6. Six months prior to his admission into hospital on May 9th, 1911, his parents had noticed that his development was abnormal. His weight was 4 st. 2 lb. and height 4 ft. 2 in. He had a slight moustache; his voice was deep like an adult's. He was slow in intellect and in movement. Hair was abundant over the pubes; no axillary hair. The external genitals were fully developed. No bronzing of the skin. Heart and lungs normal. No abdominal tumour. The pulse varied from 72 to 88 per minute; blood pressure 110 mm. Hg. The boy remained in hospital five weeks, during which time he put on 11 lb. He was seen again on October 15th, when his weight was 5 st. 5 lb. 5 oz. and height 4 ft. 4½ in. There was evidence of rapid growth but none of increased sexual development. He was in excellent health.

Cases and Specimens.

The following were among the exhibits:—Dr. Edmund Cautley: (1) *Tetanoid spasms* in an infant. Attacks of rigidity had occurred about every half an hour since it was 10 days old. (2) A girl, aged $3\frac{7}{12}$ years with *Amnesic aphasia*, following an acute illness, which was either encephalitis or serous apoplexy. Dr. J. Porter Parkinson: *Haematuria* in a syphilitic girl aged 8. The case was shown to elicit opinions as to whether the haematuria was due to the syphilis. Some oedema had occurred, and the urine contained a little albumen, but no casts. Dr. F. J. Poynton: *Congenital family cholaemia* in a girl aged 8½. The fragility of the corpuscles tested on four occasions was 0.6, 0.65, 0.65, 0.65. Dr. C. R. Box: A similar case for which excision of the spleen had been performed with benefit. Mr. P. Maynard Heath: A case of *Genu valgum* due to rarefaction and deformity of the shaft of the femur. The patient was a girl aged 8½ years. Dr. Reginald Miller: A case of *Cerebral maldevelopment* (? sclerosis) with infantilism and idiocy. Mr. T. H. Kellock: *Traumatic pancreatic cyst* in a patient, aged 11, who had been knocked down and kicked by a horse. Several weeks later an abdominal swelling had been found by the doctor at school, during routine medical examination. This had been opened and drained and the wound had healed. It contained about 50 oz. of a greenish opalescent fluid, which proved to be pancreatic. Mr. Sydney Stephenson: A girl, aged 9½, with ocular torticollis. Apparently it had been developed by a voluntary effort of the child to obviate double vision, and had become stereotyped. The sterno-mastoid and neck muscles were not rigid. Mr. Philip Turner: A case of lateral sinus thrombosis which had recovered after operation. The patient was a boy aged 14. Dr. T. R. Whipham: A girl, aged 7, with atrophy of the muscles of the forearms and of the thenar and hypothenar eminences, and interossei. It was a case of either poliomyelitis or myopathy. Dr. Alexander Morison: A specimen showing a *Deficient foramen ovale septum*. Dr. Cautley: A *Tuberculous right kidney* from a child aged 12 months. It was in an uncommonly advanced stage of the disease for the child's age.

Section of Medicine.

At a meeting on October 22nd, Dr. Frederick Taylor in the chair, Sir J. F. H. Broadbent discussed aneurysms of the aorta communicating with adjacent vessels, and described a case in point. Rupture of aneurysm into the right auricle was, he said, but rarely met with. In the present case the symptoms followed directly on an accident, the patient survived four months, and there was recurrent effusion into the right pleural cavity.

The patient, a shunter, aged 40, was well until twelve weeks before admission, when he was caught between the buffers of two railway trucks and severely crushed. He suffered from dyspnoea and shock, and was put to bed, where he remained till admission to hospital, when it was found that he had oedema of the scrotum and lower extremities, but neither cyanosis nor oedema of face. Both eyes showed subconjunctival haemorrhages. The temperature was 97° F., respirations 24, pulse 100, and collapsing rapidly, the typical pulse of aortic regurgitation. The apex beat was not visible or palpable, Cardiac dullness extended 1 in. beyond right margin of sternum. ½ in. to the left of the vertical nipple line. A diastolic murmur was audible in the fifth left space. A loud blowing diastolic murmur was audible over the aortic area, conducted down the left border of the sternum, and most intense at the level of the third left costal cartilage. There was also a blowing systolic murmur at the aortic cartilage. The abdomen was distended, and the abdominal walls and scrotum oedematous; the liver was enlarged. Some 28 pints of fluid was drawn off from the right pleural cavity, and 4 pints drained away from the legs. During the month 42½ pints were aspirated from the right pleural cavity. The pulse increased to 120, and became gradually weaker. Vomiting was succeeded by acute mania, and he died on the day following the latter. At the *post-mortem* examination the pericardium contained about 6 oz. of clear fluid, and both pleural cavities contained much fluid. The lungs were oedematous, and partially collapsed, but there were no adhesions. The liver was greatly enlarged, congested, and showed an advanced "nutmeg" condition. The right auricle was enormously dilated, admitting the closed fist. The tricuspid orifice was very much dilated, and the hand could be passed through it into the ventricle. Above the attached border of the left cusp of the tricuspid valve a portion of the endocardial lining of the right auricle was seen to project into the cavity of the auricle. In the centre of this bulging portion was a small linear tear, half an inch long, opening externally into the aorta. Behind the right posterior cusp of the aorta was a small saccular dilatation immediately above the valve. The aortic valves were normal and not thickened. During life the symptoms seemed to point to traumatic rupture of the aortic valve, causing aortic incompetence; but the recurrent pleural effusion in such large quantity, rather than general oedema of lung, seemed quite inexplicable. When the leakage took place the right auricle was probably not filled.

Dr. Parkes Weber thought it possible that, in spite of the traumatism, there might have been syphilis in the case. If so, the chronic pleural effusion was explicable. The President described some cases, which he published in 1884, of rupture into the pulmonary artery; he considered such cases were closely allied to that now described. There was no constancy about the presence of a diastolic murmur, at least with regard to the pulmonary artery, and he thought the whole question should be re-investigated in the light of the cases now on record, of which there must be a considerable number, for the symptoms were not sufficiently helpful in diagnosis. One could not conclude that the symptoms in one case would be present in another. Sir John Broadbent replied.

Section of Otology.

At the opening meeting of this session on October 18th Dr. Dundas Grant, in a short presidential address, reviewed the present position and aims of otology. Infection via the ear and the sinuses had extended the work of the aural surgeon into the cerebellum and cerebrum, to deal with the resulting abscesses there, and this work justified the Section in taking its place among the scientific societies of the world. While still remaining conservative and practical, otologists should welcome the aid of physicists, physiologists, and mathematicians, and apply data supplied with a due sense of proportion. With recent advances in the pathology of the ear tympanic operations might well be resuscitated. Reliance should be placed on no one method of testing or investigation; this particularly applied to labyrinthine conditions, in which the issues were so often those of life and death. Subsequently there was an examination of cases, the following being among those shown. Dr. Dan McKenzie recorded a case of *Lateral sinus thrombosis, with meningitis*, in a man aged 25, who had had middle-ear suppuration for fourteen years, vertigo and rigors, and a temperature oscillating between 100° and 104° F. A mastoid operation revealed a fissure in the posterior meatal wall leading into a very large cavity filled with cholesteatoma, while pus was welling up from the bulb. Two days later, as pyrexia and rigors continued, the jugular vein was tied and resected in the neck, and the lateral sinus groove opened inwards towards the bulb. Five days later, as the meningeal symptoms were but little relieved, the labyrinth was opened, and a wire drain was inserted in the internal

auditory meatus, but as it did not act well it was removed. Lumbar puncture was twice performed, owing to recurrence of meningeal symptoms, and improvement dated from this time. Mr. Richard Lake: A specimen from a fatal case of otorrhoea with right *Temporo-sphenoidal abscess*. The patient, a man aged 39, had had an offensive discharge from the ear for many years. He suffered from giddiness and was constipated, and later his temperature was 103° F., and pulse 68. The discharge from the left ear was free and offensive, and was regularly syringed with a solution of lysol. One or two stools passed were characteristic of enteric, and there was muttering delirium, with subsultus tendinum and carphology. Widal reaction was negative. A radical mastoid operation was performed on the left side, and a patch of caries found in the region of the superior horizontal canal. This was scraped. The labyrinth contained pus, and no stapes were present. The symptoms pointed to pus in the cerebrum, but exploration revealed none, though a large amount of serous fluid escaped near the fissure of Rolando. The cerebro-spinal fluid showed moderate lymphocytosis, no pus cells, and very few epithelial cells. *Post mortem* there was found a temporo-sphenoidal abscess on the right side, and an infarct more than an inch in diameter in the right lung, but the latter was not infective. Dr. H. J. Davis: A horsebean removed from the middle ear of a boy aged 7 during a radical mastoid operation, the boy having suffered from prolonged otorrhoea. Facial paralysis ensued. The sequestra removed with the bean contained the outer wall of the canal of the facial nerve.

Section of Psychiatry.

The first meeting of this Section was held on October 22nd, Sir George Savage delivering a presidential address. In its course he remarked that the value of statistics depended chiefly on the collectors. Workers should accept with an open mind experimental psychology and psychic analysis. One was asked what were their uses, but one should not always seek for immediate results. There would seem to be a need for several special subcommittees in the Section to follow certain lines of inquiry. It was easy to be misled by the senses, and there was nothing so useful to mankind as a prudent unbelief; agnosticism in science was not infidelity. Bodily and mental relationships were sometimes difficult to follow. He remembered a young woman in Bethlem Hospital suffering from acute mania who, after some weeks, became sane but paraplegic. The paralysed state lasted for some time, to be replaced by mania once more. If certain patients with glycosuria became insane the sugar disappeared from the urine. In respect of heredity he saw direct transmission of a habit in such a simple thing as handwriting, and neurologists and psychiatrists had been impressed by the passing on of nervous disorders from one generation to another. They were now content to say that a tendency was transmitted, rather than a definite entity. The speaker did not believe in the transmission of any definite mental disorder, though at least one-third of all patients admitted into asylums had insane blood relations. It was notable that in the recently published report of the Irish Commissioners in Lunacy the general conclusion reached was that alcohol was of relatively small importance as a cause of insanity in that country.

LIVERPOOL MEDICAL INSTITUTION.

At a meeting on October 24th, Dr. C. J. Macalister (Vice-President) in the chair, Dr. A. J. Wallace, in a paper recording 4 cases in which he had performed *Hebosteotomy*, expressed a belief that the operation was useful in the minor degrees of contraction where the passages were fully dilated and the child alive. On the Continent it had been performed indiscriminately, and had had very bad results. Dr. A. A. Bradburne, in a note on *Lacrymation*, related cases in which alteration in secretion was due to general causes, and protested against the use of the dilating probes in cases of overflow of tears. Dr. G. A. Crace-Calvert read a paper on *Intracranial tuberculosis in adults* based on 7 cases, chiefly meningeal. The condition had occurred chiefly in males between 30 and 45 years of age, and was always secondary to tuberculous disease elsewhere. It had been suggested that the condition was due to the use of tuberculin, but in Dr. Crace-Calvert's experience it had occurred most in cases where tuberculin had not been used. As an explanation of the preponderance of male over female cases, he suggested that men worried more over being ill, were more anxious and irritable than women. The symptoms were insidious and obscure, and a non-acute type of onset was common. Diagnosis depended on the severe persistent headache in a subject showing evidence of tuberculosis, especially when accompanied by optic neuritis, Kernig's sign, and mental derangements. Lumbar puncture showed increased quantity of secretion, turbid or clear, an excess of lymphocytes, and in 80 per cent. tubercle bacilli were found. The result was invariably fatal in adults, in from nine days to seven weeks. Dr. C. J. Macalister had seen relief from the use of wet cupping over the parietal protuberances, and in children had seen recovery after the use of mercurial inunction. Dr. W. Permewan questioned the justifiability of the use of tuberculin, as it seemed to him that intracranial tuberculosis was frequent where that remedy had been used. Dr. J. Hill Abram thought lumbar puncture was not needed for diagnosis, and he disapproved of its use if a general anaesthetic were required, as the psychical disturbance had a bad effect on the patient, and the method frequently gave no positive result. He quoted a case of intracranial tuberculosis that had apparently been cured by tuberculin. Dr. Lloyd Roberts spoke of temporary aphasia as an early symptom in these conditions; he had seen 3 cases. Dr. R. Buchanan described the method of using tuberculin at the Kennington Dispensary, where the lobing of leucocytes was taken as the indication for the dosage. Dr. Percy Marsh said he had found among children that lumbar puncture gave no result, the relief of symptoms being only very transitory. Tuberculin had proved of no use. After some further discussion Dr. Crace-Calvert replied.

NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY.

At a combined meeting of this society and of the Nottingham Division of the British Medical Association on October 23rd, Mr. W. G. Laws in the chair, Mr. R. W. Doyne of Oxford delivered a short address dealing with word blindness and allied conditions. The condition occurred when the visual memory centre in the cortex of the left angular gyrus was defective, and such defect might be either congenital or acquired. Word blindness was more common in boys than in girls. Except in regard to reading the children were generally highly developed, being quick-minded and having good memories. Sometimes the difficulty existed only in relation to printed letters, and did not extend to numeral figures. Children of this order were best taught by women, their visual memory being educated by training them to recognize words as a whole instead of letter by letter. In this connexion reading classes were especially useful. In reference to education of the brain as a whole the speaker expressed the opinion that the present system of teaching children was in effect merely one of cramming. The winner of scholarships was in other respects than that of book work often a very dull boy possessed of only a second-class brain.

We learn from the *Deutsche medizinische Wochenschrift* that a paid medical member will be appointed to the City Council of Berlin as City Medical Councillor. This appears to be one of the first acts of the new Oberbürgermeister, Wermuth. Our contemporary expresses the hope that the salary will be sufficiently attractive to secure a really good man for the post, and that the election will be made without any political, sectarian, or party considerations.

On September 26th the foundation stone of a surgical and neuro-surgical clinic in connexion with the Psycho-Neurological Institute was laid in St. Petersburg. Each clinic has 30 beds, and both are to be named after the famous surgeon, Pirogoff. The cost, which is estimated at 30,000 roubles, is to be defrayed by an anonymous benefactor. At the same time the foundation stone of a clinical institute for the investigation of alcoholism was laid. Towards the cost of this building the Russian Minister of Finance has contributed 400,000 roubles.

Reviews.

TREATMENT BY FASTING.

THE translation of Dr. GUELPA's book on *Autointoxication and Disintoxication*[1] is an extension of a paper which was read at the London meeting of the British Medical Association in 1910 on "Starvation and Purgation in the Relief of Disease" (BRITISH MEDICAL JOURNAL, October 8th, 1910). On the cover the book is called "Fasting in Diabetes," and throughout "Treatment of Diabetes" is used as a headline to the pages; this is misleading, as the number of cases in which the treatment has been tried is limited and the results are hardly convincing. The translator's introduction, which occupies twenty-seven pages, does not supply this want, as he gives only one case observed by himself, and, although there was some improvement, a single case proves nothing. In the case quoted from a paper by Dr. Bardet the amount of sugar passed is about ten times as much as the carbohydrates taken in the diet! and the table on page 17 gives figures which we are unable to reconcile with the usually accepted analyses of such a diet.

However, to turn to the book itself—the plan which Dr. Guelpa recommends is entire abstinence from food of all kinds for three days, during which time the patient may drink as freely as he pleases of water, weak tea without milk, toast and water, fruit infusions, etc., and must take a bottle of Hunyadi Janos water daily. He claims that under this treatment there is entire disappearance of any painful or uncomfortable sensation of hunger, and extraordinary diminution of the number of bacteria present in the intestines; a marked diminution of thirst, suppression or marked diminution of perspiration; regular sleep; steadying of the pulse and lowering of the blood pressure, and increase in the percentage of haemoglobin, and in the number of red and white blood corpuscles. Most of the twenty-seven cases treated were not diabetes, but included such conditions as winter cough, obstinate sciatica, obesity, severe headache, pulmonary congestion, muco-membranous gastro-enteritis, alcoholic liver, various eye troubles, anaemia, and melancholia. Dr. Leprince reports on thirteen cases of eye trouble where Guelpa's method was employed as an adjunct to other treatment.

After the period of complete abstinence Guelpa recommends a week of milk diet, and then, after a second abstinence for three or four days, he gives the following diet:—Breakfast: Coffee or tea without milk. Lunch and dinner: Clear soup, salad, one or two apples or pears, with tea or other non-nutritive drinks as desired. In special conditions he allows an ounce or so of bread or a dish of cooked vegetables. The chapter by Dr. Oscar Jennings—the use of the method in the treatment of morphine addiction—does not add much to our knowledge, as it has rarely happened that he has found cases suitable for the treatment, but he gives two examples in which he found it useful, and he sums up his impressions of it by saying that, "without vaunting it as a 'cure,' it may be looked upon as a most valuable adjunct to treatment in many cases."

Fasting cures are popular in America, and undoubtedly there are many conditions in which it has long been recognized that abstinence from food or the taking of only minimum quantities of nourishment favours recovery. It is, however, an essential part of Dr. Guelpa's treatment that fasting should be accompanied by free purgation. Although the author has not placed before us evidence which is altogether convincing, we commend the book to our readers, and think that with due precautions the method should have a trial in suitable cases.

ANIMAL POISONING.

IN his *Vergiftungen durch Tiere und Animalische Stoffe*,[2] Dr. F. KANNGIESSER has prepared a companion work to his earlier volume on vegetable poisons. It is got up on the same plan and the method of treatment is similar. The aim of the author is to give a brief account of the various kinds of poisonous animals, the nature of their products, the symptoms to which these give rise, and the most advisable treatment. The volume is small, but he has succeeded very well; at the same time much of the information is necessarily scrappy and unsatisfactory. A considerable number of references to more comprehensive works is given, but these are not in every case the best that could be cited. Practically every class from protozoa to vertebrata yields instances of poisonous animals, and there is much diversity of means by which they inflict damage. There are the stinging threads of coelenterates, the bites and stings of insects, the spines of fishes, and the fangs of snakes. Again, there is the large class of internal parasites many of which give rise to substances of a poisonous nature. The author deals not only with these, but also with substances of animal origin which are used medicinally—for example, cantharides, thyroid extract, and adrenalin. A few remarks are made on the subject of meat poisoning, but it cannot be said that they are particularly lucid. The section dealing with anaphylaxis and serum intoxication is little more instructive. Short reference is made to diseases due to disorder of internal secretions, such as exophthalmic goître, osteomalacia, and puerperal toxic conditions. The sections devoted to arthropods as carriers of disease and to rabies are outside the scope of the book, but their inclusion is not unjustifiable, and on the whole, we think the information collected by Dr. Kanngiesser will be found generally serviceable and accurate.

SYPHILIS AND PARASYPHILIS.

FOR the class of readers to which it is offered no more suitable book could be found than Mr. BAYLY's *Clinical Pathology of Syphilis and Parasyphilis*.[3] It is a small, compact, and attractive volume which is easy to read and handy for reference. Its scope of treatment is intermediate between that of the textbook of general bacteriology and that of the special monograph. It is thus particularly suited for students and practitioners who desire to possess a more intimate knowledge of the subject than can be acquired in the course of ordinary training, without having to sift for themselves the large mass of conflicting opinions which can only be satisfactorily tackled by those with an extended experience. The main theme of the book is, naturally, the Wassermann reaction and its various applications; it is practically the first and last word in the volume. Salvarsan and mercury treatment also receive considerable attention, more especially in regard to their effect upon the Wassermann reaction. The author, like the majority of experienced authorities, is a firm upholder of the original technique of the reaction, and although he admits the value of several modifications, not only in regard to labour-saving but also by reason of greater delicacy in certain cases, he considers that none of them possess the same value for general diagnostic purposes. He has given a succinct account of the method, and has explained many of the difficulties which may arise, but in a few cases his explanation would only be completely intelligible to those who have had some practical experience. He is, further, an enthusiastic believer in the virtues of salvarsan, and he teaches that the ill effects which have been ascribed to its use have been grossly exaggerated and are practically non-existent. The intravenous method of administration is carefully but simply described. A useful chapter is devoted to the subject of syphilitic anaemias, which do not usually command the attention which their importance appears to deserve. The concluding chapter deals with the relation of syphilis to life insurance, and the somewhat drastic suggestion is made that the Wassermann reaction should form part of the routine examination of all candidates for life insurance. In view of the effect which syphilis may have in shortening life, and of the ease with which the presence of the disease in a latent form may be missed, the suggestion is essentially a good one, and its adoption would certainly stimulate increased activity in laboratories

[1] *Autointoxication and Disintoxication.* An account of the new fasting treatment in diabetes and other chronic diseases. By G. Guelpa (Paris). Translated by F. S. Arnold, B.A., M.B., B.Ch.Oxon. Introduction by the Translator, and a chapter on the use of the method in the treatment of morphine addiction by Oscar Jennings, M.D. (Paris). London: Rebman, Limited. 1912. (Cr. 8vo, pp. 152. 5s. net.)

[2] *Vergiftungen durch Tiere und Animalische Stoffe.* By Dr. F. Kanngiesser. Jena: Gustav Fischer. 1911. (Post 8vo, pp. 49. M. 1.)

[3] *The Clinical Pathology of Syphilis and Parasyphilis.* By H. W. Bayly, M.A., M.R.C.S., L.R.C.P., Pathologist to the London Lock Hospitals, etc. London: Baillière, Tindall, and Cox. 1912. (Fcap. 8vo, pp. 208; plates 3, figures 22. Price 5s. net.)

of clinical pathology. The only serious misprint in the book is on page 67, where Throma-Zeiz occurs.

Dr. MULZER'S book on the diagnosis of syphilis by biological methods[4] is intended to afford practical instruction in the various methods of demonstrating the *Spirochaeta pallida*, and the technique of the Wassermann reaction. Most of the stains which have been recommended for demonstrating the spirochaete are accurately described, and special attention is paid to the examination of this organism by means of dark ground illuminations. What may be noted in passing is a revival of a method introduced into microscopy by the Rev. J. B. Reade, as long ago as 1838. As regards the Wassermann reaction, the original method and its chief modifications are minutely and clearly described. The author regards this reaction as useful in differential diagnosis, but of doubtful value as regards prognosis and treatment. In an appendix to this (second) edition, mention is made of Wolff-Eisner's attempt to obtain a cutaneous reaction in syphilis, but the work of Noguchi on this subject is too recent to have been included in this book. For those familiar with the German language Dr. Mulzer's book can be recommended as an excellent practical handbook.

Dr. STADLER, in this clinical monograph on syphilitic disease of the aorta,[5] points out how relatively modern has been its recognition, although in the eighteenth century the connexion of aneurysm with syphilis had been recognized by Lancisi, Morgagni, and Scarpa. He dates the real appreciation of the relations of syphilis to arterial disease from Heubner's monograph on syphilitic disease of the brain arteries, published in 1874, although Heubner considered that the affection was limited to the middle-sized and smaller vessels. The relation to aneurysm was first brought clearly before the profession in the paper on aneurysm in the British army, by Surgeon-Major Welch, published in the *Medico-Chirurgical Transactions for 1876*. Since then the work has been carried on both from the histological and from the clinical side, especially during the last ten or twelve years. The evidence in favour of the syphilitic nature of the lesion is the history of syphilis and the occurrence of other syphilitic symptoms in the same patient, its occurrence at a relatively early age, the presence of miliary gummata in the coats of the vessel and of syphilitic lesions in other organs. Spirochaetes have been found, but only rarely, as might be expected if we consider that when the cases came to *post-mortem* examination the disease has generally run its course. The Wassermann reaction certainly proves that the patient has had syphilis, but not necessarily that the aortitis is syphilitic. The author believes syphilis of the aorta to be very common, for his experience at Leipzig showed that in 211 out of 256 cases it was present, and in 117 was the cause of death. It is also common in cases of congenital syphilis; Rach and Wiesner found it in 67.4 per cent. of the cases of congenital syphilis examined by them. The disease occurs at all ages, but is most common in the later half of the forties. In a great many cases it has been difficult to ascertain the date of infection, but this appears to have been, as a rule, about twenty years before death; the shortest period was five years. It is often associated with tabes and general paralysis of the insane. The early symptoms are pain behind the sternum and in the left shoulder, with diminished strength and shortness of breath, the latter being due, in the author's opinion, to loss of the proper function of the aorta; inequality of the radial pulses is often found owing to the localization of the disease around the orifices of the arteries. There is also generally increased systolic blood pressure. Hypertrophy of the heart is, as a rule, absent, but pulsation in the episternal notch can generally be perceived, and the author draws attention to an abnormal displacement of the heart's apex to the left when the patient lies on his left side. There is also some increased breadth of dullness in the second and third left interspaces and over the upper half of the manubrium. The *x*-ray photograph shows the shadow of the vessels to be broader and more deeply toned. The second aortic sound is accentuated, and there is often a systolic murmur heard at the top of the sternum. According to Curschmann the heart sounds may be audible over the left supraspinous fossa. Insufficiency of the aortic valves often occurs with the characteristic symptoms and signs, and where the coronary arteries or their orifices are involved early angina pectoris may occur. In writing of the treatment the author points out that the use of salvarsan has often been followed by fatal results, although Weintraud has had good results with small doses, 0.2 to 0.4 gram, repeated two to four times by intravenous injection. But at Leipzig they have been content to stick to mercury and potassium iodide. He thinks the course should be repeated at intervals of three to six months, and that the patient should be warned against over-exertion, the abuse of alcohol, tobacco, coffee and tea, and against overloading the stomach and bowel. He is strongly of opinion that such cases should be treated in a hospital or nursing home, and points out that the results are more favourable than in ordinary aortitis deformans, but that a complete restoration of structural integrity is hardly to be hoped for. The book is a good account of the subject, and has a full bibliography of recent papers.

[4] *Praktische Anleitung zur Syphilis Diagnose, auf biologischen Wege.* Von Dr. P. Mulzer. Second edition. Berlin: Julius Springer. 1912. (Demy 8vo, pp. 37; Abbn. 20, Tfn. 4. M. 4.80.)

[5] *Die klinik der syphilitischen Aortenerkrankung.* Von Dr. Ed. Stadler, Privatdozent an der Universitaet. Mit I Tafel. Jena: Gustav Fischer. 1912. (Med. 8vo, pp. 93. M. 3.)

SEWAGE DISPOSAL.

UNTIL about the middle of the last century the disposal of sewage presented few problems, for the simple expedient was adopted of discharging it into the sea, or into the nearest watercourse. With the rapid increase of industrial centres which then took place, it came to be realized that some other steps must be adopted, at any rate as regards watercourses, if these were to be saved from becoming huge open sewers, dangerous to the health and offensive to the noses of the neighbouring inhabitants. The alliterative aphorism, "the rain to the river, the sewage to the soil," was glibly used by sanitary engineers to persuade the local authorities of those days to embark upon schemes of sewage disposal based on the principle of broad irrigation. Sewage farms came into existence, and it was predicted by some enthusiasts that they would become sources of revenue to those localities in which they were placed. It is well known that these sanguine expectations have not been realized, and it was not long before other methods, including those by precipitation or by chemical treatment, were put forward as a solution of what had in course of time become a serious problem. A still further development took place some sixteen years ago, when Mr. W. J. DIBDIN suggested the adoption of that form of biological treatment of sewage which is now known as the aërobic method. This was graphically described by Mr. Dibdin in a lecture delivered last year at the Royal Sanitary Institute, and the lecture has since been elaborated by the author and published as a pamphlet.[6] The biological action which is essential to molecular disintegration of sewage is very clearly explained by Mr. Dibdin, and he then goes on to describe in some detail the construction of a pair of contact beds, one filled with coarse and the other with finer material. After using coke, clinker, and similar substances in the contact beds, the idea suggested itself of utilizing thin layers of slate, superimposed one on the other at regulated intervals, in the belief that there would be a much greater area of exposed surface than when substances of an irregular outline were used. The early experiments of Mr. Dibdin were carried out at the Sewage Works at Sutton, Surrey, and have been described by Mr. C. CHAMBERS SMITH, formerly engineer and surveyor to the Sutton Urban District, in his pamphlet, *Economy in Sewage Disposal*.[7] Mr. Smith is an ardent advocate of the biological treatment of sewage, but he favours the adoption of percolating filters, which he considers have the advantage over contact beds in that they may be constructed without artificial walls. He admits that the problem of the disposal of sludge has not been entirely solved by the adoption of the bacterial treatment, but he points out that, notwithstanding this, such treatment has led to a great reduction in the cost of purifying

[6] *The Rise and Progress of Aërobic Methods of Sewage Disposal.* By W. J. Dibdin, F.I.C., F.C.S., etc. London: The Sanitary Publishing Co. (Demy 8vo, pp. 59; 49 illustrations. 1s.)

[7] *Economy in Sewage Disposal.* By C. Chambers Smith, M.Inst.C.E. London: The Sanitary Publishing Co. (Demy 8vo, pp. 32: 4 illustrations. 1s.)

sewage. In addition to the account of the Sutton sewage works Mr. Smith gives in a condensed form a large amount of information which cannot fail to be useful to those who may be called upon to advise concerning sewage disposal schemes.

So many of the American cities and townships are situated on the banks of large rivers that the urgency of dealing with the sewage before it enters these waterways has not been so apparent as in this country. Within the past twenty years, however, many sewage-disposal works have been established in the United States. Some of these, together with the whole question of sewage disposal as it concerns many of the constituent States, is ably discussed by Mr. George W. Fuller in his work on *Sewage Disposal*.[8] One section of the book deals with the composition of sewage and the behaviour of bacterial and bio-chemical processes in its decomposition. In another section arrangements for screening, settling tanks, septic tanks, chemical precipitation, and electrolytic treatment are described. Methods of filtration are considered at some length, but the most interesting portion of the book to British readers is that devoted to an account of American experience in the disposal of sewage by dilution in inland streams, lakes, tidal estuaries, and the sea. The author asserts that dilution is a proper method of sewage disposal when by dispersion in water the impurities are consumed by bacteria and larger forms of plant and animal life, or otherwise disposed of so that no nuisance results. The dilution method is adopted at Washington, where the sewage of 800,000 persons is discharged ultimately into the River Potomac, and apparently without nuisance or risk to health. As an instance of the facility with which self-purification is carried on in streams, the author states that at New Orleans the muddy Mississippi river water showed during 1901–2 almost no trace of sewage pollution, either as to organic matter or disease germs, although on the watershed the sewage of about nine million persons was discharged into the stream or its tributaries. The value of the work is greatly enhanced by the inclusion of a most comprehensive index to the contents, which has been compiled with a great deal of painstaking care.

It is quite as important to construct adequate conduits for the conveyance of sewage to outfall works as it is to have those works of a suitable type, and in the *Main Drainage of Towns*[9] Mr. F. Noel Taylor sets out with a considerable amount of detail the best methods that should be adopted in the construction of these conduits. Although a large portion of the work is of necessity devoted to technical matters, of interest solely to engineers, there are several chapters of distinct interest to public health officers. That on the ventilation of sewers is a sound exposition of present-day views on the subject, and contains a good deal of information which will be new to most readers. A long and informing chapter on house drains describes good and bad traps and sanitary appliances, and gives instructions as to the best methods of testing drains. In a later chapter there is described and illustrated a system of disposing of the sewage from a small country house by means of a septic tank and by other methods. The large number of well-executed illustrations is very helpful in making clear some of the textual descriptions, though for the most part these are remarkably lucid. Cross-references are freely made use of, and place the busy reader on good terms with the author, though in one place at least (on page 128) the reference is incorrectly given, and on the same page the well-known Shone's ejectors are described as Stone's. But these are trivial matters in a work which is packed full of useful and correct information.

NOTES ON BOOKS.

The first three volumes of the *Practical Medicine Series*[10] for 1912 relate respectively to general medicine, general surgery, and diseases of the ear, nose, and throat. The publication consists of a series of ten volumes a year, each dealing with some one or more branches of medicine by giving abstracts of such papers as have been published in the previous twelve months and are judged by the editors to be worthy of special notice. These editors are usually men well known in their speciality in America and elsewhere; the editors in chief are Professors Gustavus Head and C. L. Mix, both of Chicago.

In a pleasant fluent fashion Mr. H. Jeffs, discoursing *Concerning Conscience*,[11] gives us the result of his reflections as well as of his experiences as a lay preacher, in regard to the innumerable moral perplexities and temptations of modern everyday life. The book is not ambitious; its author disclaims in his preface the intention to indulge in philosophical or theological speculations, with which he not unreasonably considers the market already overstocked. But he says—and we can well believe him—that he is not surprised that just such a book as he has here attempted has been hitherto lacking, inasmuch as he has found the task of writing it very difficult. Nevertheless, he has persevered; and we can fairly congratulate him upon the result. Keeping throughout in close touch with actuality, he has dealt with a number of typical instances of moral pressure, commercial, domestic or professional, indicating the spirit and method in accordance with which each contingency should be met. If his counsel does not lean overmuch to the side of austerity, it certainly indicates lines of conduct far higher than those which commonly prevail. And it is addressed not to heroes, but to average folk.

In a compactly printed book, Mr. F. L. Rawson discourses, from the point of view of "Christian Science," upon things in general and the fallacies of most other points of view in particular. With every admiration for his industry and erudition, we do not feel that *Life Understood*[12] sheds real illumination upon the primaeval mysteries. To deny the existence of unpleasant facts on the plea that, being "evil," their reality is incompatible with divine goodness, is merely a *petitio principii*. Particular "evils" are not necessarily evil in the ultimate sense; they may well serve some indispensable purpose. Humanly speaking, both good and evil are abstractions, and, as such, in respect of real entity, alike subject to qualification. It is not so obvious as Mr. Rawson assumes that the world would be a better place or life a finer thing without any of those factors which he so confidently, not to say arrogantly, condemns or denies. In our opinion the rapid growth of the "Christian Science" cult is largely attributable to a widespread sense of the need of a more courageous and affirmative attitude towards life and reality. So far it may be considered a healthy sign; on the other hand, the power for good of this leaven of merit is unfortunately minimized by the falsity of its doctrines and the huge presumption of its claims.

Writers of books on nursing commonly exhibit a somewhat unhappy tendency to deal at disproportionate length with what may be called medical student subjects, but no such defect is visible in *First-Year Nursing*[13] by Miss Minnie Goodnow. On the contrary, nursing duties pure and simple are dealt with almost exclusively. In addition all the statements made are succinct, while the illustrations are excellent. For this reason it should be a very useful book to put into the hands of a person who has commenced a nursing training but whose acquaintance with the technique thereof is yet small.

[8] *Sewage Disposal.* By George W. Fuller. New York: McGraw-Hill Book Company. (Med. 8vo, pp. 782. 25s. net.)

[9] *The Main Drainage of Towns.* By F. Noel Taylor. London: Charles Griffin and Co. (Med. 8vo, pp. 323; 350 illustrations. 12s. 6d. net.)

[10] *The Practical Medicine Series.* Series 1912, vols. i, ii, and iii. Chicago: The Year Book Publishers. 1912. (All Cr. 8vo, annual subscription 10 dollars, separate volumes 1.50 dollars each.)

[11] *Concerning Conscience: Studies in Practical Ethics.* By H. Jeffs. London: James Clarke and Co. 1912. (Post 8vo, pp. 278. 3s. 6d. net.)

[12] *Life Understood from a Scientific and Religious Point of View, and the Practical Method of Destroying Sin, Disease, and Death.* By F. L. Rawson, M.I.E.E., etc. London: The Crystal Press, Limited. 1912. (Demy 8vo, pp. 675. 7s. 6d. net.)

[13] *First-Year Nursing.* A textbook for pupils during their first year of hospital work. By Miss Minnie Goodnow, R.N. Illustrated. Philadelphia and London: W. B. Saunders Company. 1912. (Demy 8vo, pp. 328).

The fourth Congress of Physiotherapy will be held at Berlin in March, 1913 (26th to 30th), under the presidency of Professor His. The principal subject proposed for discussion is the treatment of disturbances of the circulation. The work of the congress will be divided among four sections: (1) Hydrotherapy, balneology, seaside and climatic treatment; (2) electro-therapy and radium-therapy; (3) orthopaedics, movement treatment and massage; (4) dietetics. There will be an exhibition in connexion with the Congress.

An Address

DELIVERED AT THE ROYAL ARMY MEDICAL COLLEGE ON THE OCCASION OF THE PRIZE-GIVING, OCTOBER 29TH, 1912.

BY

SIR HENRY MORRIS, BART., F.R.C.S.ENG., F.R.C.S.I.,

CONSULTING SURGEON TO THE MIDDLESEX HOSPITAL, AND EMERITUS LECTURER ON SURGERY AT THE MEDICAL COLLEGE; FOREIGN CORRESPONDING MEMBER, SOCIÉTÉ DE CHIRURGIE, PARIS; HONORARY MEMBER, MEDICAL SOCIETY, STATE OF NEW YORK.

IN addressing a company such as this, I am unfortunate in that I cannot speak from personal experience or from first-hand knowledge of the attractive combination of the medical and military professions to which most of my hearers belong.

It is simply as a clinical teacher and lecturer for over thirty-five years in a London hospital and medical school—in which capacities I have necessarily taken part in the general medical education of many students who subsequently joined the medical service of the army or navy—that I am in any way qualified to speak to you on this occasion.

I shall not, therefore, presume to criticize or discuss either military medical education or the career to which it leads; but, instead, I will venture to make a few remarks on the history of the army surgeon and the gradual development of the Royal Army Medical Corps.

But, in the first place, allow me on behalf of my audience and myself to congratulate those of you who are the recipients of prizes to-day.

These prizes ought to afford you a double gratification—first, because they are the rewards of industrious and successful study; and, secondly, because they serve to perpetuate the memory, and carry with them the names of some of those who have done so much to promote the progress of your profession.

In the next place, let me say to the unsuccessful competitors, "Do not be disheartened or discouraged by your present failure." I have often heard and seen quoted on prize-giving occasions the verse ascribed, probably wrongly, to Solomon, which says: "The race is not to the swift, nor the battle to the strong, neither yet bread to the wise, nor yet riches to men of understanding, nor yet favour to men of skill; but time and chance happeneth to them all."

Doubtless this often is so! Still, it is not for me to attempt to lift up the hearts of the unsuccessful by disparaging the successful, by uttering a single word which might seem to throw doubt upon the full merit and rightful success of those who have carried off the laurels.

Rather, I would remind you of the numerous opportunities in the future which your many-sided profession, which will take you to all parts of the world, affords you of gaining honours and distinctions in scientific research, in preventing or curing disease, or in some administrative or executive capacity.

The other day I came across a reprint of an article on "Life in a Hospital," written in 1883, by Walter Besant. The author of *All Sorts and Conditions of Men*, in describing the hospital life of patient, nurses, and medical students, said of the latter that when they went into practice they would cease to learn much more, but would simply follow by rule of thumb what they had been taught at the hospital; that though the Huxley or the Darwin of the next generation might be among them, only a few would have any enthusiasm for science or their profession. The author did not limit his remarks to medical students only, but applied them to the Church, the law, the teaching profession, and all others.

In 1883, however, the Royal Army Medical Corps did not exist, or assuredly Sir Walter Besant would have made it an exception to his far too sweeping sarcasm.

The army medical officer of the present day, with the facilities afforded by this well equipped college and its affiliated hospital for acquiring knowledge under its eminent professors and teachers; with the advantages of the proximity of the college to large civil hospitals, libraries, museums, and medical societies; and with periods of study-leave and periodical examinations carrying with them acceleration of promotion graduated by a scale of passing marks, is little likely to stagnate or fossilize. If he does so, his fate is to lose his commission. Compulsory retirement for slackness or ignorance is, however, I am glad to hear, a very rare occurrence.

It is a matter of surprise that, although throughout the ages doctors have served with armies and have been the trusty confidants and friends of the leaders of armies, whether emperors, kings, or other less exalted persons, yet that no consolidated military medical system existed in the British army until the latter part of the nineteenth century—nothing approaching it, I believe, before 1882.

In times as remote as that of the siege of Troy army doctors were held in the highest esteem. The two sons of Aesculapius, Machaon and Podalirius, were, according to Homer, very important persons indeed in the Greek army. Recall what a stir was made in the third great Trojan battle, when Paris, "the spouse of Helen, dealing darts around," struck Machaon in the right shoulder. The wounded surgeon was carried off the battlefield by Nestor in that grand old warrior king's own chariot; and Achilles, sulking in his ship, having watched the progress of the battle, sent Patroclus to inquire what had happened. It was when describing these events that the poet exclaimed:

> A wise physician skilled our wounds to heal
> Is more than armies to the public weal.

Recall, too, that amidst all the greatest heroes of the Greek army—Agamemnon, Ajax, Ulysses, Achilles, and many others—Machaon was always spoken of as "the great Machaon," as in the following lines from Pope's translation of the *Iliad*:

> Of two famed surgeons, Podalirius stands
> This hour surrounded by the Trojan bands;
> And great Machaon wounded in his tent
> Now wants that succour which so oft he lent.

Those of you who are Fellows or Members of the Royal College of Surgeons of England are no doubt aware that Machaon and Podalirius are to this day commemorated being represented as the supporters of the shield in the coat of arms and common seal of our College.

In the sixth and fifth centuries, during the wars of Persia with the Asiatic States, Darius I (521–485 B.C.), the "King of the whole civilized world," and "the King of Kings," as he called himself, as well as his successors, had Greek physicians and surgeons in their suites.

In the accounts of the wars of the Persians against the Greeks we read of the physician Ctesias of Cnidus as being for seventeen years (414–398 B.C.) in the service of the kings of Persia. Ctesias is specially remembered, not as constantly accompanying Artaxerxes II (404–359 B.C.), but as being a great historian, like Herodotus and Xenophon, of the Persian wars. The Persians, to their honour, conducted their wars with great humanity, and treated their prisoners with kindness, and in many instances even with liberality and favour.

Philip, an Acarnanian, was physician and surgeon to Alexander the Great, and accompanied him through his Asiatic wars. There is an interesting story told of them. When Alexander was lying seriously ill at Tarsus a letter reached him warning him that Philip had been bribed by Darius III to poison him. Having read the letter, Alexander handed it to Philip to read, and after doing so swallowed a potion which Philip had prepared for him. This proof of the unshaken confidence of the king in his physician was soon followed by Alexander's recovery.

In the second century of the Christian era the illustrious Galen was specially summoned by Marcus Aurelius to be with him in his campaign in Northern Italy. But evidently Galen did not like being an army surgeon, even though in attendance on the emperor, because, when Marcus Aurelius was afterwards setting out to conduct the war on the Danube, Galen begged to be left behind, alleging that such was the will of Aesculapius; consequently he was allowed to remain at Rome, and was charged with the care of the health of young Commodus, the unworthy and licentious son of the noble-minded Marcus.

In the fourth century an eminent Greek medical writer, Oribasius, the friend of Julian, accompanied that cultured but eccentric emperor in his wars against Persia, was with him when he was wounded, and at his death, and was one of the very few persons to whom Julian confessed his apostasy from Christianity.

Skipping over the centuries of the Dark Ages, we find that the most noted surgeon in the sixteenth century was Ambroise Paré. He served with the army for thirty years in the wars of François the First and three other kings of France; and had the courage to rebuke Catherine de Medici for her religious bigotry. He enjoyed the love and confidence of the French soldiers to so great a degree that his mere presence sufficed to reanimate a disheartened garrison or a half-beaten army.

Of the great English surgeons of the Tudor period two may be mentioned—Gale (1507–1587), who served in the army of Henry VIII., and Clowes (1540?–1604), in that of Elizabeth's reign.

A great surgeon under the Stuart dynasty, equally popular and successful in military and civil practice, was Richard Wiseman (1622–1676), a Londoner born, who joined the Royalist army in 1643, and accompanied Prince Charles with his troops into exile. Wiseman was the first of the barber surgeons who emancipated surgery from the state of subordination to the physicians. He wrote in so clear and simple a style that his works were selected by Samuel Johnson, when writing his dictionary, as a mine of good surgical nomenclature. Wiseman underwent repeated imprisonment for the Royalist cause, but, after the Restoration, Charles II made him his sergeant-surgeon and gave him a pension for life.

In the time of the French revolution and far into the nineteenth century the most renowned surgeon with the French armies was Baron Larrey (1766-1842). Larrey was both a great surgeon and a great administrator. He was the first military surgeon who was ever mentioned in dispatches; he was the inventor of the flying ambulance, the idol of the French soldiers, who called him the "hero of humanity," and was spoken of by Napoleon as being the most honest man he had ever known.

Among the medical officers under Wellington there was one whose name is a household word in the army medical service. Sir James McGrigor was with the army in the Peninsular War from 1812 till the restoration of peace in 1814. Then he returned home, and was made Director-General of the Army Medical Department in the following year (1815), a post which he continued to hold for thirty-six years. As an army doctor he was quite a genius. He had great courage and self-reliance, but possessed also consummate tact and administrative ability, qualities so essential for one who has subordinates to direct and control. He instituted army medical benevolent funds. He raised the Army Medical Service to a higher standard than it had ever attained before. Wellington could not speak sufficiently highly of him, and the medical officers who had served under him presented him with a service of plate valued at a thousand guineas. It was through his influence with the Duke of Wellington that the medical officers of the British Army came to be mentioned in dispatches. It is difficult to say whether it was by the officers or the rank and file of the army that he was most respected and beloved.

Other military medical notables of the end of the eighteenth and early part of the nineteenth century were Sir John Pringle, Munro, Jackson, and Fergusson, but time will not permit me to do more than name them.

In the Indian Medical Service in the nineteenth century the names of two officers stand out very prominently. Both served with distinction in the Burmese wars.

Sir Ranald Martin, C.B. (1793–1874) was an authority on medical topography, on military sanitation, and on the effects of tropical climates on European constitutions, and he wrote the article on hospitals in Holmes's *System of Surgery*. He will ever be remembered as the introducer of iodine in the treatment of hydrocele. After settling in London he was made Inspector-General of Army Hospitals, and a member of the epoch-marking Army Sanitary Commission, of which Sidney Herbert was chairman.

Sir Joseph Fayrer, Bart. (1824–1907), was connected with the Indian Medical Service for forty-five years from 1850. He was very successful as a field surgeon in Burma, was a prolific writer on Indian climatology, on the pathology of Indian diseases, and on sanitation. He lectured at the London College of Physicians on tropical diseases and on Indian fevers. His work on venomous snakes was considered the best book on the subject which had ever been published. He was elected to all sorts of honours, and was a personal friend of King Edward VII. He was also a keen sportsman to the very end of his long life.

Brigade-Surgeon Henry E. Busteed, M.D., C.I.E., who died this year at the age of 78, was formerly in the Honourable East India Company's service, and is celebrated for his *Echoes from Old Calcutta*.

This brings us down to the present day, but I must not venture to allude to men still living who have done honour to the Army Medical Service and received honour through it.

The lessons taught by Sir James McGrigor were well nigh forgotten in the long peace between Waterloo and the Crimean war. Yet there was in the interval a man—Dr. Henry Marshall—whose name seems to be almost forgotten nowadays, although I was shown one of his books ready to hand in Professor Melville's private laboratory in this college on Thursday last. Marshall (1775–1851) saw much service at home and abroad, and was appointed Inspector-General of Military Hospitals in 1830. By his labours he prepared the way for many of the reforms which were subsequently made or proposed. He wrote reports on the health of the troops in different stations, which were laid before Parliament. He was the first to prove the value of military medical statistics. He wrote a book of instructions for young medical officers on recruiting and other subjects, and he made suggestions for the advancement of military medical literature. Dr. John Brown in *Horae Subsecivae* wrote a long chapter on "Dr. Henry Marshall and Military Hygiene." Sidney Herbert must have been well acquainted with Marshall's writings; and Lord Panmure when Secretary of State for War declared that Marshall's *Military Miscellany* was his Bible in all that related to the welfare of the soldier. Marshall died in 1851, three years before the Crimean war.

The science of sanitation was little known in the early part of the nineteenth century, but between the Peninsular War and 1851 it had made great strides, and the system of army hospital administration which prevailed in 1814 was consequently out of date in the Crimean period. Hence the shortcomings born of a long peace as revealed in the military hospital at Scutari, and amongst the sick and wounded before Sebastopol, shocked the public mind and raised a terrible outcry in the press.

During the Crimean war and in the years immediately following, several circumstances occurred which tended to promote the welfare of soldiers, the improvement of military medical education, and the reform of the Army Medical Service generally.

(*a*) In the first place, Sidney Herbert (1810–1861), afterwards Lord Herbert of Lea, was "Secretary at War" on the outbreak of the Crimean campaign in March, 1854, and in 1856 he was made chairman of a Royal Commission appointed to inquire into the sanitary condition of the army and of the military hospitals and barracks. He had gained an intimate knowledge of the defects of the service and knew the crying need there was for reform, and one of the leading principles which guided him, and to which he frequently referred, was that it is easier to prevent disease than to cure it; that the duty of the army doctor was to keep soldiers in health as well as to treat them when sick and wounded.

One has only to read in Lord Stanmore's life of him some of Sidney Herbert's letters to various persons in authority to realize how earnest and insistent he was to have only the right persons selected for the Royal Commission, to have the scope of the inquiry as wide as possible, and to obtain a promise that the findings of the Royal Commission should be made use of without delay to strengthen the hands of the executive in bringing about reforms.

(*b*) Another very important circumstance was Parkes's great work on hygiene. Sidney Herbert was the chief apostle of Army Medical Service reform, and he was fortunate in having as a contemporary Edmund Alexander Parkes who was just ten years his junior. Herbert made great use of Parkes's knowledge of hygiene. He sent him to Turkey in 1855 to select a site for, and to superintend a large civil hospital to relieve the pressure on the military hospital at Scutari. During the formation of the Army Medical School at Fort Pitt—the first school of the kind in this country—Parkes was frequently consulted by Sidney Herbert. On the opening of the school in October,

Parkes accepted the Chair of Hygiene, and organized a system of instruction which stood the test of subsequent years.

After the school was transferred to Netley in April, 1863, Parkes published his *Manual of Practical Hygiene*, which was at once appreciated throughout the civilized world, and on his death, in 1876, Baron Mundy, the Professor of Military Hygiene in the University of Vienna, in concluding his biographical sketch of Parkes, said: "All the armies of the Continent should at parade lower their standards craped, if but for a moment, because the founder and best teacher of military hygiene of our day, the friend and benefactor of every soldier, Edmund Parkes, is no more."

(*c*) Another circumstance, and one which was at once beneficial to sick and wounded soldiers, was the friendship of Florence Nightingale with Mr. and Mrs. Sidney Herbert. This intimacy led Miss Nightingale to write to Mrs. Herbert to make the proposal that she (Miss Nightingale) should be permitted to go to Scutari to help in the military hospital there, and take with her a number of nurses voluntarily provided by the benevolence of a private institution of charitable ladies.

This letter crossed in the post one from Mr. Herbert to Miss Nightingale, proposing to her that she, as the only person in England fitted for the task, should go to Scutari with a staff of female nurses appointed by Government, and with all the advantages which such authority carried with it. Miss Nightingale at once accepted the appointment, and we all know the marked success which attended this previously untried experiment.

How firmly the scheme took root, and how it has developed, is shown by the fact that whereas only 40 nurses went out with Florence Nightingale to Scutari, 800 were employed in the South African war; and one of the recommendations of the Royal Commission on that war is that the employment of female nurses in fixed military hospitals for the care of the wounded and such of the sick as can be suitably nursed by females should be on a larger scale than during the greater part of the war.

(*d*) Other events soon happened which brought in their train great benefit to the sick and wounded in time of war. After the Italian campaign in 1859 the question of the neutrality of the wounded was first ventilated by a Neapolitan doctor (Palasciano), and about the same time a Swiss philanthropist (Henri Dunant) published his *Recollections of Solferino*, in which he described what he had witnessed on the battlefields of Italy. The result was an international conference held at Geneva in 1863, from which took origin the international society known as the "Red Cross Society."

The Geneva Convention was signed on August 22nd, 1864, when fourteen different States pledged themselves to regard as neutral, in time of war, the sick and wounded and all belonging to a military nursing staff. The Red Cross, which became the badge of the society, was henceforth acknowledged by every European State.

Amongst the earliest and most zealous promoters of the Red Cross Society was Queen Augusta of Prussia, afterwards to become the German Empress Augusta. The work of the society became her chief object of thought, and in the Austro-Prussian war in 1866 she introduced the newly-developed hospital system. When peace was restored the "Union of Women Workers," which Queen Augusta had founded, continued its usefulness in epidemics and other disasters among the civil population. Again, on the outbreak of the Franco-German war in 1870, the Queen was the leading spirit of 2,000 committees for sending "help to the Rhine." These committees dispatched to the seat of war 677 private hospitals and a German corps of volunteer nurses consisting of over 4,400 males and 1,703 females, besides many millions of marks worth of clothing and other requisites for the comfort of the sick and wounded.

Now, the mother of the German Empress Augusta was Maria Paulowna Grand Duchess of Weimar, and the Grand Duchess was the daughter of Paul I, the Czar of Russia (1776–1801), by his second wife Maria Feodorowna. This lady originated, and during her lifetime directed, so many benevolent schemes for the good of the Russian soldiers and civil population, that after her death her son had to establish a special bureau to carry them on.

The Grand Duchess, in her little State of Weimar, founded the "Patriotic Union of Women Workers," which was the prototype of the much larger "Union of Women Workers" which half a century later was founded by Queen Augusta under the Red Cross.

I refer to the splendid work of these great ladies, the Czarina Feodorowna, her daughter, and her granddaughter, as well as to the fact that Sidney Herbert was the son of the eleventh Earl of Pembroke by his second wife, who was a Russian lady of great intellect and vigour of mind, and the daughter of Count Woronzow, for many years the Russian Ambassador in England, in order to point out how much the armies as well as the civil populations of Europe have been indebted to the initiative, the labour, the example, and the hereditary influence of Russian women. It is probable that Herbert's great work was instigated and influenced largely by the character and training of his Russian mother as well as by the circumstance of the Crimean war.

Herbert's Russian family connexion exposed him to the suspicion that he was to blame for the breakdown of the military organization in the Crimea; but the Roebuck Committee proved that, on the contrary, Herbert had made the most strenuous efforts to prevent and correct the errors and failures which unhappily occurred.

Time will not allow of my attempting even to epitomize the chequered course of army medical reform since the time of Sidney Herbert; nor to enumerate the grievances and complaints of army medical officers which led to such a dearth of candidates for the service during the last decade or more of the nineteenth century.

The removal of these disabilities and causes of unpopularity was largely due to the exhaustive inquiry, and to the report and the recommendations based on that inquiry, of the Subcommittee of the British Medical Association on Army Medical Reform. In that report, which was published in March, 1897,[1] the formation of a consolidated army medical corps as an integral part of the army, with military rank and titles and better pay for its officers, promotion by merit, shorter tours of foreign service, more holidays, opportunities for study leave, increase in the army medical establishment, and various administrative reforms were all earnestly advocated.

It was a little more than one year after the issue of this report—namely, on May 4th, 1898—on the unique occasion of the first banquet ever given by a Lord Mayor of London to the medical profession, that the Marquis of Lansdowne, then the Secretary of State for War, announced that the Army Medical Staff and the Medical Staff Corps would be formed into one corps, and that Her Majesty had signified her pleasure that the new corps should be called the "Royal Army Medical Corps" and should be given military titles up to and inclusive of the rank of colonel.

I was present on that occasion and I well remember the joy and satisfaction with which that announcement was received by the whole medical profession. I recall also the many laudatory things said of the medical officers of the army by Lord Russell of Killowen and by Lord Lansdowne, who, be it remembered, is himself a descendant of that brilliant and remarkable man, Sir William Petty, M.D., who was Physician-General to the Army in Ireland in 1662.

And here I will venture to remark that the consolidation into a royal corps and the granting of military rank and titles must never lead the army medical officer to forget that his first duty is to be a good doctor, and to maintain a high standard of professional efficiency; and that he should also endeavour to increase the well-being of his patients by relaxing as far as possible the rigid discipline of military hospitals.

Since 1898 we have had the South African war, and the report of the Royal Commission on the care and treatment of the sick and wounded during that war, based on evidence taken on the spot. We had in May, 1901,[2] another report, with recommendations for the reorganization of the Army Medical Service, drawn up by a subcommittee of the British Medical Association; and in the following October (1901) was issued the Report of the Committee on Organization of the Army Medical Service,

[1] BRITISH MEDICAL JOURNAL, 1897, vol. i, p. 732.
[2] SUPPLEMENT to the BRITISH MEDICAL JOURNAL, May 4th, 1901.

appointed by the Secretary of State for War,[3] and presided over by the Right Hon. St. John Brodrick himself. Finally, there followed in March, 1902, the Royal Warrant[4] confirming the important changes recommended by the Organization Committee.

It is interesting to read side by side the Report of the South African Royal Commission, published in 1901, and the letters of Sidney Herbert in the *Memoirs by Lord Stanmore*, published in 1906.

Nearly every one of the suggestions of the Royal Commission for remedying defects had been made by Sidney Herbert fifty-five years before. Such is the procrastination in bringing about reforms which have to be paid for by the Government, and the disastrous want of which is not perpetually, but only in times of war, evident to the British taxpayer.

Thus the recommendations of the Royal Commission as to (1) the increase and greater elasticity of the staff of officers and orderlies; (2) arrangements enabling medical officers to keep themselves abreast with advances in medical and surgical knowledge; (3) the employment of female nurses in fixed military hospitals; and (4) the appointment of officers with special knowledge of sanitary science, were all repeatedly made by Sidney Herbert.

Over and over again Herbert drew particular attention to several other matters also commented upon by the Royal Commission—namely, (1) the delay and privations caused by the army medical officers having to requisition other departments for necessaries for the sick and wounded; (2) the excess of clerical work which had to be done by the principal medical officers; (3) the desirability of making it known that medical officers have the power to buy at Government expense requisites which are esser ls during a campaign; and (4) the advisability of medical officers not showing resentment or factious opposition to well-meaning though injudicious benevolent persons anxious to distribute charitable gifts amongst the sick and wounded.

Herbert also anticipated the Organization Committee of Mr. Brodrick in suggesting the establishment of an Advisory Board, or, as Herbert called it, a "Medical Council," with the Director-General at its head.

Herbert's recommendations on the subject of medical education and the foundation of a military medical school where military medical subjects should be taught, after meeting with much resistance, which probably few War Ministers but himself would have overcome, did result in the establishment of the Fort Pitt School at Chatham.

In the report of the Royal Commission, as also in Herbert's letters, there are frequent allusions to suffering and loss of life, due to the exigencies of military strategical movements and to unforeseeable misadventures which no Army Medical Service, no matter how efficient, can prevent.

Amongst such causes of sickness, suffering, and death are insufficient transport and the lightening of kit and the shortening of provisions on forced marches, want of drinking water, prolonged exposure to extreme heat or cold, gales, floods, and sand storms, some or other of which may at any time occur in campaigns, whether in the Crimea, the Nile Valley, South Africa, or elsewhere.

It is worse than injustice, it is cruel and cowardly of malicious or ignorant writers to condemn the Army Medical Service for the horrors and miseries arising from these causes.

Yet the service has not escaped in the past, and must not expect to escape in the future, abuse and obloquy of this kind.

What is satisfactory is that, on official inquiry, it has always been shown that such slanders are unfounded, and that the army medical officers, with rare, if any, exception, no matter how overworked at the time, were indefatigable and ever ready to imperil their lives in the discharge of their duties, either in hospital or in the field. So long as this can be said, and so long as army medical officers maintain a high standard of professional proficiency and a high reputation for humanity, they will continue to add to the glory and lustre of their corps, they will acquire honour and renown for themselves; they will bring relief, consolation, and health to the soldiers, and promote efficiency and economy in the Imperial and Indian armies.

[3] BRITISH MEDICAL JOURNAL, 1901. vol. ii, p. 1025.
[4] Ibid, 1902, vol. i, p. 813.

LITERARY NOTES.

AT the National Conference organized by the Joint Committee of the Independent Labour Party and the Fabian Society in connexion with the "War against Poverty Campaign" which was opened on October 11th, Mr. Sidney Webb, speaking of destitution, is reported to have said:

> On a memorable occasion the present King had said: "If preventable, why not prevented?"

This is an instance of the manner in which things said by one person are put into the mouth of another. The process goes on till sayings—and it may be added, jokes—which were already legendary thousands of years ago are fathered on any person who happens to be prominent at a given time. Many of the "smoking-room" stories of the present day may be found in Apuleius (born *circa* A.D. 125), and his *Golden Ass* is believed to be a *réchauffé* of much older materials. It was Edward VII when Prince of Wales who, in his presidential address to the seventh International Congress of Hygiene and Demography, held in London in August, 1891, in speaking of the improvement of sanitary conditions, said:

> Although the heaviest penalties of insanitary arrangements fall on the poor, who are themselves least able to prevent or bear them, yet no class is free from their dangers or sufficiently careful to avert them. Where could one find a family which has not in some of its members suffered from typhoid fever or diphtheria or others of these illnesses which are especially called "preventable diseases"? Where is there a family in which it might not be asked, "If preventable, why not prevented?"

A report of the whole address will be found in the BRITISH MEDICAL JOURNAL, August 15th, 1891, p. 349.

It is a strange instance of the perversity of the human mind that, whilst moralists and novelists join hands in denouncing the misery caused by drunkenness and avarice, few of them have attempted to paint the equally unpleasant effects of gluttony. Yet no reader of *Le Cousin Pons* is likely to forget the fate of the unhappy musician whose love of good cheer condemned him to lead the life of a parasite at the table of his rich relations, and whose troubles all arose from his inability to abandon the dinners that afforded him such heartfelt satisfaction. It is hardly surprising that Balzac should have felt his hero's sufferings so keenly, since, according to Dr. Cabanès, whose article on "The Temperament of Balzac" appeared in the September number of *L'Hygiène*, the great man himself was not entirely exempt from the same failing. Notwithstanding his almost monastic life, Balzac had all the true Frenchman's appreciation of good cookery; and whenever the overwhelming pressure of his work allowed him a little breathing space he loved to gratify his taste for certain favourite dishes. As a rule he ate very little meat, but consumed vast quantities of fruit, of which he was inordinately fond; and whilst at work on one of his innumerable masterpieces he was quite content to live for days on a diet of eggs and black coffee, the latter being carefully prepared by himself after a particular recipe. Directly, however, he permitted himself a short respite from his almost unceasing labours, his natural appetite reasserted itself and assumed its normal proportions. What these proportions were may be judged from the menu of a dinner eaten by him on one occasion, to the stupefaction of an entire roomful of people. This meal consisted of a hundred oysters, twelve cutlets, a duckling with turnips, a brace of roast partridges, and a sole, together with the usual hors-d'oeuvre, side dishes, and dessert, the whole being washed down by various choice brands of wine. We are told by one of the eye-witnesses of this gastronomic feat that by the time Balzac had finished nothing remained on the table but the bones. Perhaps it was only the natural result of this reckless abuse of a magnificent constitution that Balzac died when little over 50 years of age, a worn-out and prematurely aged man, at a time when he should have been in the full flower of his physical and intellectual vigour. Balzac's love of good wine is shared by many of his countrymen, who will doubtless appreciate M. Francis Marre's rules for choosing wines, which appeared in the September number of *L'Hygiène*. The same number also contains a most interesting account by M. André Mesureur of the famous Mohammedan hospital at Tunis, whilst Madame Augusta Moll-Weiss has contributed some excellent advice on the training and hygiene of young servants.

National Insurance.

THE INSURANCE SCHEME.

STATE SICKNESS INSURANCE COMMITTEE.

The tenth meeting of the State Sickness Insurance Committee appointed by the Annual Representative Meeting, 1912, was held on October 24th.

Dr. J. A. Macdonald was in the chair, and the other members present were:—*England and Wales:* Dr. R. M. Beaton (London), Dr. T. M. Carter (Bristol), Dr. Major Greenwood (London), Dr. S. Hodgson (Salford), Miss Frances Ivens, M.S. (Liverpool), Mr. Herbert Jones (Hereford), Dr. Constance E. Long (London), Dr. E. J. Maclean (Cardiff), Dr. James Pearse (Trowbridge), Dr. E. O. Price (Bangor), Dr. Lauriston Shaw (London), Mr. D. F. Todd (Sunderland), Dr. D. G. Thomson (Norwich), Mr. E. B. Turner (London), Mr. E. H. Willock (Croydon). *Scotland:* Dr. John Adams (Glasgow), Dr. R. McKenzie Johnston (Edinburgh). *Ex officio:* Mr. T. Jenner Verrall (Bath), Chairman of Representative Meetings), Dr. Edwin Rayner (Treasurer).

Apologies for absence were read from the President (Sir James Barr) and Dr. J. S. Darling (Lurgan).

Report of Council to the Divisions and Representative Body.

The Committee spent the greater part of the long session in considering the draft report for presentation to the Council. The several parts of the report were adopted after emendation for presentation to the Council at its meeting on Thursday, October 31st.

The full text of the three parts of the report as emended and approved by the Council for presentation to the Divisions and the Representative Meeting is printed in the Supplement.

Advertisements for Tuberculosis Medical Officers.

Advertisements sent by two county Insurance Committees for insertion in the Journal were considered (Dorset and Fife), and the Committee resolved that these advertisements should not be inserted in the Journal, the salaries offered in both cases being insufficient.

Conference of Holders of Colliery Appointments.

It was arranged that the conference of holders of colliery appointments should take place on Wednesday, November 6th, at Newcastle-on-Tyne. It was arranged that representatives from the following colliery areas should be invited to attend:

Scotland,
Northumberland, Durham, and Cleveland,
Cumberland,
Yorkshire,
Lancashire,
Midlands,
Wales (to include possibly one from the Bristol area).

At the request of the Committee, Mr. Todd undertook, in consultation with the Medical Secretary, to make the necessary arrangements, and the Committee resolved to recommend the Council to authorize the Chairman to submit to the Representative Meeting direct a report of the conference.

The following is the draft agenda paper for this conference:

1. General question of the position of the holders of colliery appointments as affected by the National Insurance Act.

Note.—The following resolutions were passed at a similar conference held at the office of the Association on November 8th, 1911:

1. That this meeting is not in favour of contracting out of the Insurance Bill for the provision of medical benefit.
2. That this meeting is of opinion that the minimum capitation fee for insured persons should be 8s. 6d.
3. That in those areas where it is found possible to arrange for attendance upon the families of insured persons, the amount of remuneration be fixed on a basis of 8s. 6d. per person per annum, but in no case shall less than 6d. per family per week be accepted.

2. Present arrangements as regards payment for colliery contract practice throughout the kingdom, with suggestions as to any proposed alterations.

3. Question of the desirability of a uniform rate (not necessarily method) of payment being adopted by holders of colliery contract practice.

4. Question of the recovery of arrears of subscriptions due to strikes, etc.

5. Any resolutions or suggestions forwarded by the various meetings of colliery surgeons held to elect and instruct representatives to such conference.

6. Any other business.

Treatment of Tuberculosis.

The Chairman reported that he had approved the scheme for Stoke Newington, and the Committee approved his action.

The scheme for Oldham was considered, and the Committee expressed its inability to approve it in so far as the appointment of the medical officer of heath and his assistant as tuberculosis officers with clinical duties was concerned. The scheme for Hampshire was also considered, but a decision postponed in order that further information might be obtained.

Miners' Provident Relief Societies and Accidents.

The Committee resumed the consideration which it had postponed at a previous meeting for further information, the question of whether appointments held under miners' provident relief societies involving the treatment of accidents should be resigned, and adopted the following resolution:

> That, as from the Provisional Medical Regulations it is clearly intended that accidents should be included in medical benefit, the appointments referred to should, under the terms of the pledge, be resigned.

REMUNERATION OF PHARMACISTS.

The following statement has been issued to the press by the Insurance Commissioners:

The Pharmaceutical Standing Committee on Insurance were received to-day (October 25th) by the Insurance Commissioners at Buckingham Gate. The question of whether the remuneration of pharmacists under the Act should be calculated by reference to a tariff was discussed, and a model tariff, which had been prepared by the committee, was submitted to the Commissioners. It was agreed that the Commissioners could not approve any tariff in such manner as to make its adoption binding on Insurance Committees generally. But the Commissioners were willing to accept the principle of remuneration by reference to a tariff and to accept a model tariff (if any such tariff could be agreed) as being of such a nature that if submitted by any Insurance Committee as part of their arrangements under Section 16 of the Act the Commissioners would be prepared to approve it. The Commissioners further accepted the principle that there should be, in the case of preparations dispensed, a separate charge for each item of the prescription, for the container (if supplied at the cost of the Medical Benefit fund) and for the work of dispensing. The committee appointed Messrs. P. F. Rowsell, J. P. Gilmour, D. Arnott, E. S. Waring, and W. J. V. Woolcock as a subcommittee to discuss and arrange the details with the Commissioners.

NATIONAL SCHEME FOR THE TREATMENT OF TUBERCULOSIS.

State Grants to County Councils.

At the present time it may be useful to recall attention to a letter addressed by the Chancellor of the Exchequer to Mr. Hobhouse, Chairman of the County Councils Association, at the end of last July, setting out the contributions which the Government was prepared to make towards the cost of a national scheme for the treatment of tuberculosis.* After recalling the fact that the Government had

* British Medical Journal August 10th, p. 322.

provided the sum of £1,500,000 towards the capital expenditure required for the provision of sanatoriums and other institutions, he went on to say that under the Insurance Act an annual sum of nearly £1,000,000 was provided for the treatment of insured persons suffering from tuberculosis. He then went on to state that in view of the opinion that schemes for the treatment of tuberculosis should relate to the whole of the community, and that they should be organized and carried out by the councils of counties and county boroughs, the Government was prepared, in response to the representation of the County Councils Association, to place at the disposal of the Local Government Boards of the three kingdoms an annual sum representing, approximately, half the total estimated cost of treating non-insured persons, as well as the dependants of insured persons.

It should be remembered that the Insurance Act—Section 17 (1)—authorizes an Insurance Committee, if it thinks fit, to extend sanatorium benefit to the dependants of insured persons. It is not at present anticipated that the annual fund available under the Insurance Act will suffice for the dependants of insured persons as well as the insured themselves.

Capitation Fee for Domiciliary Attendance.

The following communications deal with the proposal that a fee of 6d. per head on the total number of insured persons should be substituted for the payment for services rendered in the domiciliary treatment of tuberculous patients. It should be noted that the position is complicated by the fact that the larger scheme includes not only insured persons, but also their dependants and uninsured persons. This point was not dealt with by the Chancellor of the Exchequer in his statement to the Advisory Committee, or in his reply to Sir Philip Magnus's question in the House of Commons.

Dr. E. G. Hamilton Williams (Colwall, near Malvern) writes: I desire to call attention to an aspect of Mr. Lloyd George's new proposals in regard to sanatorium benefit, an aspect which has so far received no attention.

In his speech before the Advisory Committee, on October 23rd, he stated that he proposed to give the doctors a capitation fee of 6d. per annum for each insured person, to cover the cost of treatment of tuberculosis, this capitation fee to be in lieu of the payments for attendance, fees for which have, in many cases, been already arranged.

What will be the effect of this new proposal?

1. It will tend to put a stop to the zeal which was being aroused amongst doctors in regard to the detection and treatment of tuberculosis. Many doctors were beginning to study the use of tuberculin, and were devoting much more care to the detection of early cases of pulmonary tuberculosis, and the county and city bacteriologists were having many more specimens of sputum sent to them for examination for tubercle.

The reason for this activity in regard to tuberculosis were twofold.

First, it appeared that we were, at last, to be given the opportunity of successfully treating cases of tuberculosis among the poor.

Secondly, the fees promised for this treatment under sanatorium benefit were comparatively good.

Mr. Lloyd George gave as one reason for his new proposal that it would prevent a doctor being exposed to the temptation of keeping a patient at home for domiciliary treatment when it might be better for the patient that he should be sent to a sanatorium. It might be a temptation, but, if necessary, the chief tuberculosis officer should be able to prevent this, and, moreover, under his new proposals Mr. Lloyd George's argument cuts the opposite way, for with payment by capitation fees it will clearly be a temptation to the practitioner to get every case sent to a sanatorium, in order that he should be relieved of the trouble of treatment and, in the case of tuberculin, of a form of treatment involving much time, trouble, and care.

2. The new proposals will be to the detriment of the public purse.

In a sanatorium each case will cost between 20s. and 30s. a week to treat, and in many cases the dependants will have to be supported while the breadwinner is away, whereas it is now the experience of an increasing number of doctors that many cases can be treated most successfully at home and with the patient still at work. The cost of such treatment is only about 10s. a week, and thus, on financial grounds, is infinitely superior to treatment in a sanatorium. The new proposals will give an enormous impetus to the building of sanatoriums—that is, the spending of money on bricks and mortar.

But the new financial proposals are as detrimental to the doctor as to the public:

1. With regard to fees, many Insurance Committees have already agreed to pay a fee of 5s. for the first report on any case, and a fee of 2s. 6d. for each consultation, and of 5s. for each consultation accompanied by an injection of tuberculin, the Committees supplying the tuberculin free of cost. They are also agreeing to pay mileage when the patient is seen at his own home.

2. In any case of pulmonary tuberculosis treated with tuberculin, it is usual to give about two injections a week—that is, at intervals of three or four days. Thus each such case under domiciliary treatment would bring in about 10s. a week to the doctor treating it.

3. Such cases are generally under treatment for a period of at least six months, and may require to be kept under the treatment for as long as two years. I will take the shortest period—namely, six months; this, at 10s. a week, gives £13 for six months' treatment of *one* case.

4. Let us suppose that under the Insurance Act a doctor had 500 insured persons on his list, for each of whom under the new proposals he would receive 6d. a head per annum (total £12 10s.). Of these 500 persons many will, under the Act, be unselected lives. One might, therefore, on a quite moderate basis, estimate that 5 per cent. would be tuberculous and require treatment at one time or another. But as I wish to keep quite on the safe side, let us suppose that only 1 per cent. are thus affected. If these five have domiciliary treatment with tuberculin, the doctor would receive in fees, for six months' treatment only, the sum of £65 (5 + £13 = £65). But if Mr. Lloyd George's new proposals are accepted he will only receive £12 10s. for twelve months' treatment, no matter what the number of cases of tuberculosis he may have.

In short, if the new capitation fee of 6d. per head in lieu of fees for attendance is accepted the profession will make an extremely bad bargain.

If the profession refuses to work the sanatorium benefit under the altered conditions, Mr. Lloyd George will only have himself to thank.

Dr. Major Greenwood (London, N.E.) writes: At the present crisis it will be necessary for the profession to note very carefully the profound change that has been made by the recent utterances of the Chancellor of the Exchequer with regard to sanatorium benefit as it affects the general practitioner. The whole of the emoluments that it had been thought would have been derived by the profession from the working of this benefit has been swept away, and in its place an extra sum of 6d has been added to the capitation payment for medical benefit. For the last three months every effort has been made to preserve to the profession as much of the treatment of tuberculosis as possible. Now it is to its pecuniary interest to shunt as much of it as it can on to the hospitals and special institutions dealing with the treatment of that disease. All the certificates and treatment included under the domiciliary duties has become part and parcel of the ordinary medical benefit, and as there is nothing to limit the claims in that direction the increased burden thrown on the practitioner cannot but be regarded with grave apprehension.

It will be remembered that one of the chief inducements put forward by the Chancellor in favour of the medical benefit under the old conditions was that the practitioner would be freed from the obligation of attending numerous cases of chronic pulmonary disease, and that where they were called upon to do this work they would be recompensed by suitable fees in proportion to the work done. All this is now changed. Every particle of the work will be required for the addition of 6d. to the capitation payment. It is true that £1,600,000 has been added to the net amount out of which the capitation payment is to be made. But the burden of all extras has been thrown on to the profession, the proper cost of which was admitted

by the Chancellor before the Liverpool meeting to be about £2,000,000.

In addition entirely new conditions are demanded. It is stipulated that the attendance afforded shall be of a better character than that hitherto supplied. There are to be more visits and more time given to individual patients; and last, and not least, simple records are to be kept, open to official inspection. Where the gain to the profession comes in it is difficult to see, and requires an eye of faith to discover. A duty certainly devolves on the medical apologists of the action of the Chancellor to explain to their incredulous brethren the practical advantages likely to be derived from the acceptance of this latest offer; and until this is done a very considerable number of us will consider that the last position of the profession in respect to medical benefit is worse than the first.

BIRMINGHAM GENERAL PRACTITIONERS' UNION.

AT a meeting held on October 28th of the West Birmingham Ward (which comprises the North and West Parliamentary Division of the city) the following resolution was carried unanimously:

> That this meeting of the West Birmingham ward of the Birmingham General Medical Practitioners' Union considers the terms suggested by the Government opens a way for an honourable compromise; and considers it advisable for the Representative Meeting (to be held in London) to give full powers to the State Sickness Insurance Committee to reopen and complete negotiations, in order that the medical benefits may come into force on January 15th, 1913.

AN INVITATION MEETING IN FAVOUR OF ACCEPTANCE.

IT is announced that "a meeting of members of the medical profession in favour of accepting the terms offered by the Government under the National Insurance Act" will be held on Tuesday, November 5th, at the Westminster Palace Hotel, at 4.30 p.m. The meeting will be invited to adopt the following resolution: "That the terms offered by the Government to the medical profession are acceptable." The resolution appears to be both defective and redundant. It is defective because it does not state by whom the terms are considered acceptable. Had it been completed by the addition of the words "to those attending the meeting," its redundancy would have been apparent, for only those "in favour of accepting the terms" are invited to attend the meeting, and, as they are all in favour of accepting the terms, to adopt a motion to the effect that the terms are acceptable seems a pure work of supererogation, which is defined as the "doing of more than duty requires." It should be clearly understood that those who attend the meeting will only express each his own individual opinion. The meeting will have no representative character or authority, and the members of the general press are invited to take note of this fact. The promoters of the meeting also are, we understand, issuing the following memorial for signature:

> The final terms announced for Medical Benefit are considerably higher than those previously offered. There is a definite promise that the whole situation will be reviewed in three years. We, the undersigned, think therefore that it is possible for the medical profession to accept service under the National Insurance Act.

Meetings of the medical profession in every part of the country will be held during the next few weeks, when the present position will be fully discussed with the assistance of the full report which the Council of the British Medical Association is issuing this week. It is open to the medical men who consider that the terms offered by the Government to the medical profession are acceptable to attend these meetings; it is, indeed, clearly their duty to do so in order that they may take their share in the momentous decision now to be taken. We do not think that any useful purpose, but rather the contrary, can be served by private meetings of persons all pledged to one opinion.

Dr. Addison requests us to state that the statement appearing in the *Daily Mail* of Wednesday, October 30th, wherein it was suggested that he was a party to a meeting the purpose of which was to create dissension in the ranks of the profession on the question of Mr. Lloyd George's offer under the Insurance Act, is incorrect. "I am well aware," he writes, "that amongst other misstatements which have been circulated respecting myself has been one that I have favoured an undertaking directed against the British Medical Association. I have never in public or in private encouraged any such enterprise. On the contrary, I have often pointed out how mistaken a policy it would be, and, so far as I could, I have tried to serve the Association, whilst I have not hesitated at the same time to say wherein I disagreed with its proposals."

CORRESPONDENCE.

THE number of the BRITISH MEDICAL JOURNAL for this week has been issued under considerable difficulties. Special arrangements have been made to publish the report of the Council to the Divisions and the Representative Body, and this document is necessarily so long that it occupies practically the whole of the space of the SUPPLEMENT. The Editor has received numerous letters on the present position of the profession in regard to the insurance scheme. Owing to their number and the length of some it became apparent that it would be impossible to publish all of them in this issue, if the other insistent calls upon the space at disposal and on the resources of the printers were to be met. A few of the letters which follow are printed in full, but the majority are curtailed in the attempt to give a fair representation of the various views expressed. As will be seen, most of the letters received by the Editor are very critical of the offer recently made by the Government. It should be added that the Medical Secretary has also received a number of letters, and that in the large majority of these the writers express opinions in favour of the acceptance of the terms now offered.

THE TERMS AND CONDITIONS NOW OFFERED.

DR. JAMES HOLMES (Bury) writes: Mr. D. Lloyd George having announced a considerable increase in the suggested amount of remuneration for medical work done under the Insurance Act, and having accepted the principle of "periodical revision," I feel my letter of October 5th has been fully justified. I am therefore emboldened to write again. The condition of affairs is such that a compromise might be made, and I believe the following would be fair.

Remuneration.—The profession to accept for one year the amount Mr. Lloyd George suggests. A fair and ample scale of fees to be fixed and the capitation fee to be rearranged at the end of the year, according to the value of the work done. Afterwards the capitation fee to be rearranged at fixed periods on the same basis. Mr. Lloyd George suggests three years for a trial, but inasmuch as the medical profession consider the proposed remuneration too little, each might give way somewhat. The capitation fee might with advantage be under two divisions, town and country, with two subdivisions, chronic invalids with old persons in one, and young healthy persons in the other. These divisions would make absolutely no difference in the total amount to be paid, but only in the sharing amongst the medical men.

Removal from Panel.—Place this in the hands of the General Medical Council or even its Executive Committees. This body is partly nominated by the Government and partly by the medical profession. It is most jealous of the good name of the profession and would never countenance a man receiving fees and not giving a fair return for them. This would be "infamous conduct in a professional respect" and punishable accordingly. Let it be empowered to consider complaints made either by Insurance Committees or by Medical Committees. I would, however, give the local Insurance Committee the power to remove an insured person's name from any list (if it thought fit to do so) during the current year at the request of the insured person. At present our patients are free to leave us at any time they like if not satisfied, so we should be

no worse off than we are now. The facts that a medical man might at any time lose a patient if he be not properly attended, and at the end of the year any or all on his list, would be a great inducement for him to try and give reasonable satisfaction.

Wage Limit.—Here I touch on most difficult ground. Though I think I see good reasons why there should be, at present, a wage limit, so far I have never heard a good argument for one. A wage limit amongst the insured would be most difficult to enforce, whereas if we accept the limit of the Act this difficulty would almost vanish. The most patent reason for a wage limit is fear of underpayment. If we are assured of full payment for our work, then this fear ceases. If, therefore, the scale of fees upon which the capitation fee is based be a satisfactory one, I think we might accept the £3 limit. If, however, the profession concede this point, then a medical man on the panel ought to be at liberty to say, "I can only have so many insured persons on my list." Otherwise, a man with a first-class reputation might be so overburdened with insurance work that he would not have time for his ordinary practice. This right to limit the list would, however, be subject to the panel, as a whole, being sufficient. Of course, such a man could protect himself by refusing to be on the panel, but I think the larger the panel and the better the men the more confidence it will inspire.

Extras.—These must always be somewhat difficult to check and the amount must of necessity be fluctuating. Possibly, if medical men must notify all extras immediately they are incurred, on post-paid forms so that the local Insurance Committee, if they thought fit, could inquire into any or all at once, a sufficient check would be established.

While the above ideas are not such as I as a medical man would prefer, yet they form a fair ground for compromise.

Dr. Hamilton S. Faber (Cricklewood, N.W.) wites: If the new grant is accepted it should be with the following provisos:

1. The profession should be allowed the option, in all cases, of doing the dispensing if they wish. It has always been the practice to dispense for this class of patient, and we should have to continue so to do for the wives and children. Presumably there is supposed to be a profit in it, otherwise it would not be offered to the chemists. Some men do not wish to dispense, mainly on account of the time and trouble it takes; but this should not cause them to prevent their more energetic brethren from so doing. Good drugs are more likely to be dispensed by the doctors, to whose advantage it is to get a contract patient well quickly, and there is nothing to prevent the chemist from using the cheaper and inferior brands of drugs, such as the non-alcoholic tinctures.

2. The extra 6d. should be finally allocated to the doctor. The profession should not lend itself to working under what is tantamount to a bribe for cheap dispensing this extra 6d. should be a *sine quâ non.*

3. In order to prevent vexatious and trifling calls at night, and not necessarily to increase the earnings, a small sum should be charged to the patient and not to the State—say 1s. I have been summoned to a minor case at 11 o'clock at night because it was washing day and they were too busy to send before. Had there been any fee payable by them they would not have sent. If the State pays the night fee it would be immaterial to the insured whether they made vexatious calls upon their medical attendant or not.

4. Only the certificates of incapacity to the State should be given free, not to companies, and only meagre information, such as name of illness, dates of visits and consultations, should be given. In a practice as busy as mine it would be necessary for me to keep a secretary if I had to supply much information.

5. In the case of expulsion of a doctor from the panel, he should have appeal to the General Medical Council. This is the body to which the profession always has been subject, and is the one to which most people would bow, whether members or not of the British Medical Association.

I think these five suggestions should receive consideration at all the meetings of the profession, and that without them the terms should be refused. At present the 8s. 6d. is a misnomer. The profession is being offered 6s. 6d.; the rest goes to the chemists, and is of no more use to us than the other expenses of working the Act.

Dr. W. Gordon (Exeter) writes: The profession will be wise to scrutinize most closely the Chancellor's latest offer.

1. *What is it?* 8s. 6d., inclusive of drugs and extras. The sanatorium benefit (6d.) is a separate matter, and cannot properly be considered in connexion with it. In passing, however, it may be pointed out that the adequacy of this 6d. is impossible to decide.

2. *Where is the advance?* (*a*) The Chancellor himself has told us (last week's Supplement, p. 435) that "the extras demanded by the medical profession would certainly have cost 2s. at the very least; and unless some system of checking these extras, which I have never been able to devise or discover, be found, it would be much nearer 3s., or even 4s."; (*b*) 1s. 6d. is allowed for drugs, with 6d. extra if required. I have made careful inquiry of able chemists who have given special attention to this point. They assure me that I am amply justified in saying that this 6d. will be required for drugs, if proper drugs are properly supplied, with no extravagance of any kind; that the price of drugs has risen greatly of late and is still rising; and that German experience has shown the drugs cost considerably more than 2s. a head. (*c*) Therefore, as the "floating 6d." goes to the chemist, this pretended "concession" is simply a contract for extras at "the very least" possible figure, and this offer merely amounts to 6s. 6d. a head for medical attendance and extras, and we must not forget that it is not "guaranteed."

3. *What is the work required for this 6s. 6d?*—No longer as in the old club days are selected lives to be dealt with, but all sorts and conditions of lives—the chronic invalid, the tuberculous not entitled to sanatorium benefit, the malingerer, the victim of vice, and worst of all, perhaps (since women usually entail far more attendance than men) the domestic servants, the shop girls, the factory girls. And all of these will be entitled to extras, which, as the Provisional Regulations show, include minor operations, anaesthetics, special visits, night visits, mileage, consultations (except the consultant's fee), setting of fractures, reductions of dislocations and treatment of abortion or miscarriage in so far as these are not included in the maternity benefit. They are also entitled to certificates which may or may not require a statement of diagnosis; and records are to be kept of their illnesses and the attendances given, for the information of the lay controlling bodies—work not only very considerable in itself, but sometimes violating professional confidence, and occasionally laying the practitioner open to the most mischievous ignorant attack.

4. *And under what conditions?* Under the control of lay bodies, mostly composed of men wholly incompetent to pronounce a just judgement in professional questions, of lower tradition and intelligence than their medical servants, and armed with dangerous punitive powers though lacking even the ordinary qualifications of a common juryman.

5. *How does the 6s. 6d. compare with the old club rates?* Sir William Plender's report tells us that the annual charges for attendance on the working classes was about 4s. 5d. a head, whilst the price of drugs was 5d. This gives 4s. a head per annum for attendance. But in many cases a considerable proportion of club patients, whilst paying for their medical benefit, never went to their club doctor, but to some one else for treatment. Putting these at one-third of the whole, the real remuneration per patient per annum is seen to have been, not 4s., but 6s., and this for men, for picked lives, and generally not inclusive of extras. Again, the same report shows that, whilst the remuneration was as stated, only 1.7 visits were paid annually per patient. Under the Act it is reasonably certain that the number of visits will not be less than 5. If 4s. be paid for 1.7 visits, nearly 12s. should be given for 5.

Mr. George refers to the Contract Practice Report of the British Medical Association, and remarks that the vast majority were satisfied with 6s. or less, including drugs. But he forgets that this report did not contemplate a State-aided service. The replies dealt not with what was a fair remuneration, but with what was, in the patient's circum-

stances, a possible and reasonable payment. It should never be forgotten that club practice was semi-charitable, and that when the State steps in private charity naturally and properly stops. In a State-aided service the doctors must be remunerated on a business footing. He also forgets that the club doctor had the payments of all the club members, whereas under this Act he will have no such monopoly.

Lastly, the club doctor was comparatively independent as compared with the "doctor on the panel," and that if he resigned his club a number of his old club patients might remain with him as private patients and many others in a similar rank might come to him for advice, whereas under the Act "free choice of doctor" only means "free choice of doctor on the panel" and the man who resigns will probably cut himself off from all patients who are insured persons, and these will include many in a higher rank of life than the club patients have been.

Reviewing soberly the amount of the offer, the real meaning of it, the work demanded for it, and the conditions of that work, and comparing these with the remuneration, work and conditions of work in the club practice we have rightly condemned, I find it impossible to imagine the mental attitude of those men, some not undistinguished, who are advising the profession to regard it with favour. To my mind the profession would be insane to accept service under such preposterous terms.

May I urge on my professional brethren these points of policy:

1. To stand fast by the position they have deliberately and most justifiably taken up.

2. To make clear that our fight is not a financial one, but above all things to maintain the liberty of our highly technical and intellectual labours from the control of lower intelligences already proved incompetent.

Dr. H. Cameron Kidd (Bromsgrove) writes: The comments of the press of all political shades, together with what one hears said on every side, makes it perfectly clear that, while we have so far had the support, generally speaking, of public opinion in the stand that we have made, we should quickly lose that support if we refuse now to recognize that the Government has made an honest attempt to meet us and has offered us terms which represent practically the limit which the taxpayer can be expected to bear.

It is equally clear to those who know (as I do after twenty-five years of mixed general practice) the practical side of club work, that the terms now offered will give us a very satisfactory return for our work.

A single Foresters' lodge which used to pay me about £12 per quarter on the old terms of 4s. a head per year has already made sixty new young members, and this quarter, still on the old terms, has paid me £15. At 6s. a head this £15 would have been £22 10s., at 7s. 6d. a head it would be over £28, and on the terms now offered —8s. 6d. a head—(for the old 4s. included all drugs) it would be over £31; and of the sixty new members already made, there is hardly one who would have been a paying private patient in the event of illness; all are picked young lives, passed by me, and all are members who would have been welcome in the club on the old terms.

It will be apparent that the loyalty of all of us to the British Medical Association will be very severely strained if we are asked to refuse such an offer as this. I say nothing of higher motives—the helping instead of hindering of the noblest effort of social legislation that our generation has seen, except that personally these would have prompted me to accept the original terms, with the fullest confidence in the pledge of the Chancellor of the Exchequer that any amendment found necessary after, say, two years' working of the Act, would be introduced.

Dr. W. Courtenay Milward (Honorary Secretary, Cardiff Division and Cardiff Provisional Committee) writes to call attention to the following passage in the statement of the Chancellor of the Exchequer to the Advisory Committee—

> We propose . . . that a sum of 7s. is to be assured as the basis of the amount which is to be paid to the doctor for his services—

and asks: Who is there among us who would dare to say what this very disingenuous proposal is worth in hard cash, especially when it is certain that the chemists will not—in fact, cannot—even consider a hard and fast capitation fee for themselves?

Then as to the three new conditions. To one accustomed to the constantly increasing clerical work of the Poor Law medical service (some of it demanded by the Local Government Board entirely outside the terms of our contracts), the prospect of furnishing all the certificates and reports which may hereafter be required is indeed appalling, and suggests that the new terms are but little better than the old. And when to all this is added the extra time and attention required by demand No. 3, we may well pause and ask whether, in the matter of remuneration, we shall not be positively worse off than we are at present in respect of our worst paid contracts, and whether, in the matter of conditions, we shall not be compelled to work under surveillance somewhat similar to that of a Dartmoor convict.

As most of us are working pretty well full time at present, the future will present as alternatives either a large increase in the number of working hours a day or a large increase in the numbers of the profession. There will, of course, be plenty of work to justify the latter, but of payment for work done . . . ? The already dangerously small incomes of many of us would suffer almost to the the point of extinction. Do let us look more than an inch beyond our noses, and prevent, while it is still possible, the establishment of a huge, cheap, and nasty club, having many of the worst features of the existing Poor Law medical service—that scandalous travesty of the practice of medicine in which nearly all that is of any value represents the charity of its medical officers.

Dr. T. Archibald Dukes (Croydon) writes: We are winning, but to gain victory we must still stand steadfast.

We claim as a right that insured persons should pay us at the same rate as our private patients. Our private practice is taken away to make insured persons. To ask us to attend them for a less amount than that established by the law of supply and demand is to ask of us charity.

Even the unfair Plender report showed that the doctor's average income is more that £750. This makes the present income of our profession more than £21,000,000 a year.

For the medical attendance of one-third of the population the Government provides less than £5,000,000 (6s. 6d. or 7s. a head). If we have been doing this work in the past and been paid at an average rate for it, we have received one-third of £21,000,000. Therefore the Government should offer us more than £7,000,000, or a rate of 10s. a head.

On the other hand, if in the past we have not done the medical work required by this Insurance Act, then we have earned £21,000,000 by attending the other two-thirds of the population; for the extra attendance required by the Insurance Act on this third of the population we should at the same rate be paid £10,500,000, equal to a rate of 14s. a head.

Since some of the work is new, while some we have always done and been paid for, the fair rate lies between these two amounts, say, about £9,000,000, or a rate of 12s. a head.

In fact, however, we have done most of this work in the past as charity, and have not been paid for it. The Government assumes a right to our charity, and offers to pay us at such rates as it is estimated would repay us the out-of-pocket expenses of our charitable attendance. Sir William Plender estimates that 7s. is rather more than those expenses, and so he says the Government offer is "fair, if not generous." To take from us paying practice and offer us instead unprofitable charity rates is not fair. To make our past charity a reason for reducing our future income is not generous. To try to make our charity unlimited, permanent, and compulsory is outrageous.

If the Government cannot afford 12s. a head for insured persons, let them own that our attendance upon them remains a charity, and fix a low income limit. Therefore, also, leave each panel doctor his clear right to refuse to attend upon any particular insured person. Give the doctors free choice of patients, and trust to their admitted generosity. Then we could exact at least gratitude as our reward. Because this work is our charity we refuse to keep records of it. The efficiency of the service is maintained by the free choice of doctors. To maintain that freedom of competition each insured person should have the right to make his own arrangement with any doctor off the panel.

Even if the Government double their offer of payment, so long as we doctors have to undertake the whole risk of insurance, we demand control of the administration of medical benefit.

Dr. T. B. F. EMINSON (Scotter, Gainsborough) writes: Mr. Lloyd George's announcement places the Insurance Act on a firm basis, and we may heartily congratulate ourselves on the part we have jointly played in welding the Act into a workable form: and our stormy petrels on both sides, who have served their profession in their own way but from very different standpoints, may rest and recuperate for three years.

The time has now arrived for careful consideration of the proposed methods of remuneration. It appears to me that the alternative methods suggested by the Commissioners may with advantage be reduced in number. Personally I should prefer simple capitation without extras, except those we have been accustomed to, such as expensive instruments and apparatus supplied to patients for permanent use. I think the capitation system is certain to find favour in the end because of its simplicity, but we have to recognize that we are not at present united on this point, and I wish to suggest for consideration whether we cannot reduce the alternative methods of remuneration to two or at most three, and then allow each medical man to adopt the method he prefers.

Dr. GILBERT E. COPE (Westminster) writes: I was very surprised and sorry the other day to see that, after Mr. Lloyd George had made public the revised list of medical payments in connexion with the National Insurance Act, the Wandsworth Division of the British Medical Association hurriedly met, and, to my mind, very precipitately and unfortunately decided to have nothing further to do with the Government scheme because everything which we wanted had not been granted.

Surely such action is comparable to that of the spoilt child who will not eat bread and butter because he can't have cake.

Of course, we are all desperately concerned as to the future of our practices, and how we are going to keep our establishments going and our heads above water, but I do contend that the common sense attitude now is to accept the compromise terms of the Government. We shall, I am certain, retain the esteem of the public by so doing, which I am equally sure we shall lose if we go on "haggling." The terms are only for three years, and none of us can say without actual trial how the rearrangement of our practices is going to affect us financially.

We have repeatedly quoted the Post Office terms (8s. 6d. per head including medicine) as being one reason for refusing the 6s. previously suggested, and quite justifiably; but now we have got the same terms or better, how can we, without making ourselves look either foolish or mercenary, refuse these terms and—well, continue with bad debts or some public medical service yet to be devised, approved, and proved workable. Personally, I am not in the least sanguine of the British Medical Association being able to start and continue a public medical service; but suppose it could be done and was commenced. We have the word of the Government that if we do not agree to the panel system of the National Insurance scheme, it will at once commence to organize a State medical service. This for some year or two would not be altogether successful, no doubt; but in many districts it would be worked, and what about the British Medical Association public medical service in those districts? There would be incessant friction and strife, and the profession would in the long run come off second best both in prestige and pence in the fight with the Government.

Medical services are run by medical men in some towns now, and apparently successfully; but how about next year when these services have tilted against these State doctors?

For myself, although I should like our full demands to have been conceded, I am satisfied that the present figures are a reasonable compromise, and as they are only trial figures for three years, I am sure we should do well to accept them.

Dr. A. A. FELL (Colchester) writes: It is said that in asking 8s. 6d. as a capitation fee from an insured person and a less sum from a dependant we are inconsistent and are giving our case away. That is not so. It has always been a very fair and necessary custom in medical practice to ask a higher fee from a rich man than from a poor man. A State and employer-aided insured person is richer than his unaided dependant; therefore, we ask a higher fee from the former.

Putting aside numerous small defects, the Public Medical Service of the British Medical Association is impracticable for the following reasons:

1. Few members of the public will join because it is voluntary and expensive.
2. The cost of management will be prohibitive if there are few members.

It is stated that if our Public Medical Service fails and if we cannot come to terms with the Government, then our position will be undermined by the formation of a Government public medical service. The Government is not likely to undertake the formation of such service on account of its enormous cost. Such a service to be of any practical use and to attract doctors must be well paid. Therefore a Government public medical service, if formed, will be a financial asset to the medical profession, just as the Army Medical Corps is now one of our financial assets.

What are we to do if no settlement is arrived at with the Government and if our public service scheme falls to the ground? We occupy an impregnable position both tactically and in its justice and right. We have merely to hold our ground to win all along the line.

Let us say as a body to all approved societies: You have our six cardinal points, grant them, and we will serve you faithfully.

The approved societies backed by the Government and by the employers can grant our terms—we have only to stand firm and they will grant our terms.

Dr. J. S. MANSON (Warrington) writes: The increased offer of the Government, the conciliatory speech of the Chancellor, and the eloquent and distinct lead given by Sir Clifford Allbutt should induce the profession to accept service under the National Insurance Act. The terms are provisional for a period of three years, and experience will show how the regulations and the working of the Act will require modification so as to ensure efficiency and satisfaction to all concerned. The apparent success which has attended public medical service schemes in small areas must not be taken as a criterion of what would happen in a national system of such services.

Dr. BERTRAM W. BOND (Godalming) writes: It is sincerely to be hoped that no medical man will allow himself to be deceived by Mr. Lloyd George's fine attempt to bluff the profession into thinking that his second offer is an improvement on the first. The first offer was as follows:

4s. 6d., *plus* extras, *plus* attendance on tuberculous patients.

In his speech before the Advisory Committee the Chancellor distinctly states that it was originally intended that extras should be given, and quoted the demands of the profession for extras as being equivalent to a sum from 2s. to 4s. per head. The remuneration for tuberculous patients promised to be quite a fair one, and far better than the capitation fee of 6d.; in fact, Mr. George admitted that the alteration would be "economical to the State."

If we take the lowest figures quoted above for extras, we thus get:

4s. 6d. *plus* 2s. = 6s. 6d. *plus* tuberculosis fees;

as against the present offer of:

7s. (inclusive of tuberculous fees) *minus* 2s. = 5s.

In addition to this reduced remuneration, all medical men should note that:

1. The cardinal points are still ungranted.
2. We are expected to act as clerks to the Commissioners in supplying notes on cases.
3. We are to guarantee an improved medical service.
4. We are to be dictated to as to how often we should visit patients and as to how much time and attention we give them.
5. If the latter is unsatisfactory to the patients we may be arraigned before a court of inquiry dominated by a majority of laymen.
6. The same may happen if use is not made of the most modern means of diagnosis.
7. We must be ready, night and day, to attend any insured

person, drunk or sober, possibly miles away from home, for a consideration infinitely inferior to the old sweating terms of the clubs.

Dr. CHARLES S. PATTERSON, M.B., M.R.C.S. (Rural Representative, Hungerford, Reading Division, British Medical Association) writes: The Chancellor's special pleading in favour of sweating by the State instead of by the friendly societies may be safely passed over. Because a number of club practitioners whose necks had become hardened to the yoke said they would be satisfied with five or six shillings, are we all to be forced into the same slavery?

My practice was made by hard work, and the expenditure of over £1,000, not to speak of the first cost of professional education. Now my patients are taken away by law without compensation. What care we whether Sir Clifford Allbutt or any other medical or surgical knight give this scheme his blessing. What does he know about the general practitioner's business? Nothing, and less than nothing. We country doctors are men well educated in our profession, many of us skilled by long experience, known and respected by our clients and neighbours. The Government for its own ends seizes our business without compensation. Compensate us fairly and many of us will shake the dust of this ungrateful country off our feet, and seek some other corner of the world where even the skilled labourer is worthy of his hire. The Chancellor denies that a state medical service is being instituted. Why is the scheme to be revised in three years' time? In order that the schemers and the enthusiasts may have time to attract students into a whole-time scheme, and then the blow will be struck. The National Medical Service is sketched, all under the rule and governance of the medical officer of health, who is either a professional rival or, if a whole-timer, absolutely ignorant of general practice. For what is the present scheme but a State-paid medical service, where the least possible price is to be paid and the greatest harassment is to be inflicted on the wretched slaves who enlist or are trepanned to serve?

The Chancellor offers the provision of drugs to the country doctor,

and, of course, there is no doubt at all that that to a very large extent will be taken into account when the doctors among themselves come to discuss the question of mileage.

What a reflection on an honourable body of men—probably the hardest worked and worst paid section of our profession! Here is a direct invitation to recoup ourselves for our miles of bad and inferior road travelling by giving our patients equally bad and inferior drugs.

Thank God I, for one, can safely say, after a quarter of a century of practice, that I have made no difference—and never will as long as I practise my profession—between the drugs supplied to patients, be they rich or poor, private, contract, or pauper.

The country practitioners may be poor, but we are honest. As to what Sir Clifford Allbutt and Dr. Norman Walker said, it should be remembered that they do not represent the profession. The loyal members of the Advisory Committee resigned their seats long ago. One reads with surprise Professor Sims Woodhead's views, as given by Sir Clifford Allbutt, but memory takes me back to when I worked under Dr. Woodhead twenty-eight years ago in the University of Edinburgh—then, as now, his head was so far above the clouds that he did not see the toils with which baser spirits were entangling his feet.

Sir William Plender made a somewhat peculiar pronouncement on the Chancellor's offer—"that the remuneration which is now offered by the Government is a very fair remuneration to the doctors, if not, indeed, generous." The words of this offer are generous, but the offer is not. One is instinctively reminded of the words of St. James: "And if one of you say unto them, Depart in peace, be ye warmed and filled; notwithstanding ye give them not those things which are needful for the body; what doth it profit?

COMPARISONS.

Dr. W. B. VAILE (Aldershot) writes: The new proposals of the Chancellor will no doubt receive careful consideration, but I am convinced that the more care that is devoted to them the less satisfactory to him will be the decision of the profession.

His proposals, as he admits, do not satisfy our six points, and as we are all pledged to accept nothing less, I fail to see the danger of the split in the profession that he so earnestly desires.

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Be its defects and difficulties what it may, a public medical service means freedom and self-respect. It may interest Messrs. Mills and Harford (whose disinterested efforts on our behalf will not, I am sure, go unrewarded) to know that a service is running in several towns, notably at Southampton, where it has given satisfaction to all parties for nine years.

	At Present.	Public Medical Service.	National Insurance Scheme.
Fees	4s. per annum	10s. 10d.	6s. 6d. to 7s.
Income limit ...	None	Strict	*None.*
Free choice of doctor	None	Absolute	Very doubtful.
Extras...	Few	Full list	*None.*
Protection against night calls, Sunday calls, etc.	None	Ample	None.
Bookkeeping ...	Little or none	Little or none	Very much.
Certificates expected	On and off	On and off	Unlimited.
Reports	None	None	Unlimited.
Dispensing	In our own hands	In our own hands	Prescriptions.
Control	Lay, but local	Entirely in our own hands	Entirely out of our hands; lay and stranger.
Hearing of complaints	"	"	By laymen largely.
Locums or assistants	Allowed	Allowed	*Forbidden.*
Special exams., *e.g.*, bacteriological	Not expected	Given as extra	*Demanded free.*
Treatment	Simple only	Simple with extras	Every kind conceivable.
Personal misconduct	Barred	Extra	Included free.
Hours	Unlimited	Strictly limited	Unlimited.
Clinical records ...	Unheard of	Unheard of	*Demanded.*
Troublesome patients and chronics	—	Can be refused, or made private patients	*Must* be attended by *somebody*, and at normal rates.
Mileage	Over three miles	Over two	None.
Inspectors	Unheard of	Unheard of	*Insisted upon.*
Red tape	Little or none	Absolutely none	*Unlimited.*
Net result ...	DRUDGERY	FREEDOM	SLAVERY.

Dr. GEORGE N. BIGGS (London, W.) writes: It behoves every member of the profession to look most carefully into the details of the latest offer made by the Chancellor of the Exchequer. According to him it is a most generous concession, and he is supported in this by those gentlemen who have remained upon his Advisory Committees after the profession had decided to ask them to retire.

What I wish particularly to point out is, however, that as usual, when the Chancellor gives with one hand he takes away with the other, and so leaves us worse off than before.

I think a careful examination will show that, as a profession, we should have been better off by accepting the 6s. offered last year with extras and the sanatorium benefit with its extra fees than to work under the present offer.

The First Offer.	*The Present Offer.*
4s. 6d. for the doctor and 1s. 6d. for drugs.	7s. for the doctor; 1s. 6d. for drugs; 6d. extra, which, if not used for drugs, will go to the doctor, making a possible maximum for him of 7s. 6d.
Extras for night visits, slight operations, mileage, etc.	No extras at all.
Tuberculosis benefit, with extra fees.	Tuberculosis included in above.

The utmost, therefore, that the medical man can obtain is 7s. 6d., with all extras cut off and the tuberculosis work

added. Moreover, the Chancellor makes this advance conditionally—first, that all certificates necessary to enable patients to obtain sickness or disablement benefits are to be given gratuitously; secondly, simple records of patients' illnesses and attendances are to be rendered; thirdly, services in certain respects, which have not yet been defined, must be improved, the medical man, where necessary, being required to resort to modern methods of exact diagnosis.

Against these may be set the promise to establish a central fund for the payment of drugs in cases of epidemics. It should be noted, however, that this promise is very vague indeed, no sum being mentioned, nor is there any indication from whence it is to come, by whom it is to be administered, or who is to decide on the question of the actual occurrence of an epidemic. The authority, when an appeal was made, might either demur or grant such a paltry sum that it would be useless, and in this case the medical man would obviously be seriously out of pocket for carrying out this service.

In dealing with matters of this kind, it is absolutely necessary that everything should be clearly and distinctly stated, so that no one may be under any misapprehension. The third clause requires the most careful consideration, however, for modern methods of special diagnosis are very expensive. Take, for instance, the Wassermann reaction, which costs £2 2s. (that is, six years' contribution expended upon a single examination), although there is, it is true, at present one firm which is carrying out this reaction for 15s. 6d., but even this would take two years' contributions. *X*-ray examinations, also, are at the present time necessary for the correct diagnosis of fractures, calculi, aneurysms, and pulmonary tuberculosis; it might even be construed to include the examination of the larynx, oesophagus, and stomach by the direct method; a cystoscopic examination of the bladder, or the passage of the ureteral catheter in cases of kidney diseases, blood examinations and counts, the estimation of urea, and an examination of the faeces or test meals. Its extreme vagueness constitutes its greatest danger, and if these methods are required, some arrangements should be made for their institutional provision, the want of which is one of the most serions failings of this ill-considered Act.

My desire in thus drawing attention to Clause 3 is that general practitioners may be quite aware of the fact that they may be called upon to undertake these methods at their own expense, in which case the offer of 7s. is little better than a farce.

If modern methods of diagnosis are to be made use of, the same will be demanded in treatment, and for this the sum of 1s. 6d., and if necessary 2s., is to be devoted. The idea seems to be prevalent that over-drugging will be prevented by not allowing a larger sum. That indiscriminate drugging is to be discouraged is true; but there is under the Act a far greater danger of the opposite extreme.

Now, it so happens that some of these methods of treatment are very expensive; take, for instance, a case of syphilis, which at the present time, with very few exceptions, must be treated by at least two intravenous injections of salvarsan, at a cost of about 10s. 6d. each, followed by inunctions or injections of mercury, combined in certain cases with potassium iodide, in large doses by the mouth. Potassium iodide is also very expensive—in fact, most drugs have risen at least 20 per cent. in cost during the last two or three years. In the above case two or three more Wassermann reactions are necessary during the two years following the treatment, bringing the total cost in this case to about £10—that is about twenty-nine years' contribution. The doctor will have to provide this sum out of his own pocket.

Again, take the question of treatment by vaccines, and here in almost all cases, if the best results are to be obtained, an autogenous one must be prepared, and this will cost £3 3s. It is also a well-known fact that cases of myxoedema require treatment by the administration of thyroid extract during their whole life, etc. Yet no extras are to be allowed, and it is well to accentuate the fact that upon us as medical men will fall all the costs and risks of insurance, whilst all the credit for philanthropy will be given to the Chancellor.

Dr. W. Bickerton Edwards (Seven Sisters Heath, South Wales) writes to emphasize the following points in the recently issued regulations and speech of the Chancellor of the Exchequer, which he thinks should make it absolutely impossible for any one to take service under the Insurance Act: Let me assume that a general practitioner has allowed his name to be placed on a panel. What exactly would his position be?

His practice will no longer be negotiable.

He will have lost all security of tenure, and will no longer be his own master.

His practice will undergo periodical rearrangement.

He must send in quarterly accounts.

His books must be open for inspection.

He must make elaborate returns, and for these returns there must be no charge.

He must give certificates but will not be paid for them.

He will be absolutely under lay control—of a committee that cannot possibly understand anything of medical matters.

He must be prepared to be dictated to by this committee as to the number of times they think a patient should be visited, etc.

They shall decide whether his work is properly done or not.

He must apply to them and give notice whenever he leaves his practice; and even when this important body has condescended to allow him a day off or his annual holiday he must not employ an assistant or locumtenents, but must appoint another doctor of the panel to attend his patients in his absence. This means that he is compelled to introduce to his patients a man who is in active opposition to himself.

He may report a patient for misconduct to this committee, and if the charge is proved they have the power of punishing him—"the patient"—by transferring him to another doctor on the panel. He may be haled by a patient or clique before the committee, and they may bring any charge they like against him. In 99 cases out of 100, because the committee is a lay one, the charge will be upheld, and the practitioner will be knocked off the panel, or, in other words, ruined. The inconsistency in the punishment meted out to the patient on the one hand and the unfortunate practitioner on the other needs no comment.

He will not be allowed to dispense his own drugs where a chemist is available lest he give them inferior medicines. Should there be no chemist, the authorities will make a convenience of him and allow him to dispense. The chemist is assured of his payment, and of extras in case of epidemics. During epidemics, for wear and tear of horses, cars, and self he has to look forward to smaller pay and more work.

Free choice of doctor is promised the patient and mileage to the doctor, but we find that the panel doctor will get no mileage for attending a patient who resides within three miles of any other medical man on a panel—that is, free choice is limited within a radius of three miles, and mileage is to a very great extent a myth.

He must take on the aged and chronic that the Insurance Committees themselves refuse, and must be prepared to receive and attend any undesirables the Committee see fit to allot him when they distribute them throughout the panel.

He dare not object to frivolous calls and night messages.

He cannot press for his accounts for attendance on the women and children.

He dare not remonstrate with the impudent or drunken patient.

Is there not a periodical rearrangement and what remedy, under lay control, has he when those he has offended canvass against him and apply the inevitable screw?

He must treat inclusively any venereal case that may come to him.

Expenses of Practice.

Dr. G. Percy Joy (Willesden, N.W.) writes: If conditions and remuneration are fair it should surely be possible for a good average general practitioner, working a reasonable number of hours, to make a sufficient income from this class of practice alone to enable him to live and to support and educate a family without financial strain. If he is to be efficient he must have leisure to read and think, he must have an annual holiday, and he must have a motor car.

Now 2,000 patients with a right to demand a full measure of attendance, commanding such a man's best efforts, assisted by every means that modern diagnostic methods require, will undoubtedly keep him fully occupied (indeed, he might well be worked literally to death in times of special stress).

What return is he to have under the Chancellor's latest offer? £700 gross—the Chancellor speciously suggests a possible £750.

The professional expenses of such a man—a consulting and waiting room, lighting and warming of same, maid to answer door, telephone, stationery and postage, books, instruments, emergency drugs and dressings, motor car and chauffeur (or boy to clean car, in which case the doctor is entitled to be paid as chauffeur), expenses of locumtenent during holiday—will not easily be made to fall below £300. Thus, at his best, having won success and proved himself capable of service to the nation, his

person, drunk or sober, possibly miles away from home, for a consideration infinitely inferior to the old sweating terms of the clubs.

Dr. Charles S. Patterson, M.B., M.R.C.S. (Rural Representative, Hungerford, Reading Division, British Medical Association) writes: The Chancellor's special pleading in favour of sweating by the State instead of by the friendly societies may be safely passed over. Because a number of club practitioners whose necks had become hardened to the yoke said they would be satisfied with five or six shillings, are we all to be forced into the same slavery?

My practice was made by hard work, and the expenditure of over £1,000, not to speak of the first cost of professional education. Now my patients are taken away by law without compensation. What care we whether Sir Clifford Allbutt or any other medical or surgical knight give this scheme his blessing. What does he know about the general practitioner's business? Nothing, and less than nothing. We country doctors are men well educated in our profession, many of us skilled by long experience, known and respected by our clients and neighbours. The Government for its own ends seizes our business without compensation. Compensate us fairly and many of us will shake the dust of this ungrateful country off our feet, and seek some other corner of the world where even the skilled labourer is worthy of his hire. The Chancellor denies that a state medical service is being instituted. Why is the scheme to be revised in three years' time? In order that the schemers and the enthusiasts may have time to attract students into a whole-time scheme, and then the blow will be struck. The National Medical Service is sketched, all under the rule and governance of the medical officer of health, who is either a professional rival or, if a whole-timer, absolutely ignorant of general practice. For what is the present scheme but a State-paid medical service, where the least possible price is to be paid and the greatest harassment is to be inflicted on the wretched slaves who enlist or are trepanned to serve?

The Chancellor offers the provision of drugs to the country doctor,

and, of course, there is no doubt at all that that to a very large extent will be taken into account when the doctors among themselves come to discuss the question of mileage.

What a reflection on an honourable body of men—probably the hardest worked and worst paid section of our profession! Here is a direct invitation to recoup ourselves for our miles of bad and inferior road travelling by giving our patients equally bad and inferior drugs.

Thank God I, for one, can safely say, after a quarter of a century of practice, that I have made no difference—and never will as long as I practise my profession—between the drugs supplied to patients, be they rich or poor, private, contract, or pauper.

The country practitioners may be poor, but we are honest. As to what Sir Clifford Allbutt and Dr. Norman Walker said, it should be remembered that they do not represent the profession. The loyal members of the Advisory Committee resigned their seats long ago. One reads with surprise Professor Sims Woodhead's views, as given by Sir Clifford Allbutt, but memory takes me back to when I worked under Dr. Woodhead twenty-eight years ago in the University of Edinburgh—then, as now, his head was so far above the clouds that he did not see the toils with which baser spirits were entangling his feet.

Sir William Plender made a somewhat peculiar pronouncement on the Chancellor's offer—"that the remuneration which is now offered by the Government is a very fair remuneration to the doctors, if not, indeed, generous." The words of this offer are generous, but the offer is not. One is instinctively reminded of the words of St. James: "And if one of you say unto them, Depart in peace, be ye warmed and filled; notwithstanding ye give them not those things which are needful for the body; what doth it profit?

Comparisons.

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utmost earnings for so long as he can hold his own are to be £450 (probably £400) net. If his health fails or if his popularity wanes, his income must rapidly diminish. His one hope of earning the income he is worth will lie in entering the fiercer conflict that will be waged for any patients who will pay better fees, and thus freeing himself from the slavery of the national service.

The Chancellor is willing to "trust" him to check drugs and extras, but not to pay him for such extras as those to which he will be admittedly fairly entitled. The fact, as every one with practical experience as a general practitioner knows, and as is patent to all unbiassed judges, lies in the Chancellor's own statements:

1. That the medical profession has made out a case for increased payment; and
2. That the Government's method of meeting the admittedly justified demand for this consists in offering an inclusive fee less than the minimum grant demanded (8s. 6d.), coupled with additional conditions of service, and the refusal of any payment for mileage or for extras (apart from major operations and specialist fees).

In regard to drugs. If the country doctor can make anything out of supplying drugs, the Chancellor is good enough to suggest that this can be regarded as a set-off to the mileage allowance of which he is to be defrauded, for it is granted that mileage is a fair charge.

I hope the Association will take steps to expose publicly the unfairness of the Chancellor's sneer in regard to the "insufficient powers to negotiate" of its Committee. The profession have never been granted their minimum demands. It still remains for the Chancellor to supply a basis for negotiation.

Dr. Henry Edward Gough (Northwich) writes: After carefully reading through the statement of the Chancellor and the discussion upon it, as reported in the Supplement for October 26th, I am struck by the omission of any reference to the "expenses" of a practice.

At present any practitioner in a country or country town district has working expenses which vary from £300 to £500 per annum, and the payment of these expenses is the crux of the problem. In all but exceptional districts the main income of a practice is derived from private patients who do not pay income tax, and the working expenses (consulting-rooms, attendance, telephone, motor car or horses and man, and assistant) are incurred and paid for by the private practice, the clubs and parish appointments being quite a secondary and subsidiary matter. The Insurance Act will alter all this and convert the main part of a practice into "club" work, out of which the expenses will have to come, as the private practice will be so restricted that it will not stand the expenses being debited entirely to it; it is very clear that any scheme of club work which does not allow a margin for these expenses is foredoomed a failure.

Health Risks of Medical Practice.

Dr. W. H. Spurgin (Newcastle-on-Tyne) writes: I consider we ought to obtain a pension for worked-out medical officers under the Insurance Act, upon the Government superannuation scheme. This to me appears most necessary, and we should hold out for it. Now is our opportunity. Personally, I have four friends who have suffered by inoculation from patients and their health ruined; one died therefrom and left a large family wellnigh penniless. We must safeguard ourselves as far as possible.

Rural and Town Doctors.

Dr. A. Paget Steavenson (Hurworth-on-Tees, Darlington) writes: As a country practitioner may I call attention to the monstrous new proposals of Mr. Lloyd George to the profession generally, but more particularly to those of us that have to work the rural districts? We are to receive the same fee as our town brethren. No consideration for mileage and inaccessibility of places we have to go to, and no help of trams and good-lighted roads at night. We are, however, to get 1s. 6d. for drugs and dispensing, which the town men will not get. This is no new offer, we have always had that, and I shall be very surprised if the chemists do not prove that there will be no profit in 1s. 6d., and refuse to supply drugs at that figure

I trust that in the new negotiations nothing will be settled until the just demands of every branch of the profession have been considered and righted.

At each concession (so-called) of Mr. Lloyd George we have had additions to our work.

Dr. M. Tylor (Wisbech, Cambs.) writes: The Act provides that doctors shall not themselves supply insured persons with medicines because, in spite of the fact that it is to their interests to get their patients well as quickly as possible, they might be tempted to unduly cut down the drug bill to their own advantage. As the Chancellor said, when introducing the bill on May 4th, 1911, "there ought to be no inducement for underpaid doctors to take it out in drugs." In the light of what has happened since, the use of the word "underpaid" is instructive. The Provisional Regulations of October 1st, 1912, provide that drugs and appliances shall be a first charge on the amount available for medical benefit. That the Commissioners and the Advisory Committee could imagine for a moment that such an unfair arrangement would be accepted by the doctors passes belief; at any rate, the Chancellor has hastened to delete that particular regulation. Now comes the extraordinary part. There are chemists in towns; therefore town doctors are not to be trusted to dispense medicines under the Act. But in the country districts there are no chemists; therefore the doctors in the country must be trusted in this respect. The doctors cannot, however, be trusted with regard to mileage fees, so it is ingeniously suggested that they shall recoup themselves for their mileage expenses out of the allowance for drugs. Here we have a direct inducement, suggested by the author of the Act, for "underpaid doctors to take it out in drugs." What of the position of the country practitioner who lives in a small country town which also supports one or more thriving chemists? Seventy-five per cent. of the practitioners in the Isle of Ely—a purely agricultural district—come under this head. His lot would be indeed a happy one. Nothing for his mileage, no extras—except for major operations and other specialist services, whatever that may mean—nothing for his drugs, except a possible 6d. for not using them, but, on the other hand, 7s. and plenty of records to keep.

The Chancellor states, "If the remuneration is increased the service must be improved." By his new proposals he admits that the original remuneration was inadequate; does he also mean that under those terms the service also was to have been inadequate? Was not a proper standard to have been reached and maintained under those conditions? Medical men have always assumed that a thoroughly efficient service would have to be given under the National Insurance Act. Therefore we demand fair conditions and adequate remuneration. What encouragement do these proposals give to a practitioner anxious to keep up to date, to employ "those modern means of exact diagnosis," to cultivate some special branch of medicine or surgery in which he may be interested? Is the insured person to be encouraged to go to a medical man who is not on the panel for services which the latter might well be in a position to render, but which it will not be worth his while to perfect himself in because he knows he can claim no fee. However keen a man may be, the fact that he may profit by his keenness is bound, in the vast majority of cases, to stimulate him to further efforts. Nowadays the medical profession is often spoken of as a trade union, but it differs from most trade unions in that there is no curbing of the individual; if a man is a quicker, cleverer, or harder worker than others he can reap the benefit. I am convinced that such proposals as we have before us, instead of, as imagined by Sir Clifford Allbutt and Professor Sims Woodhead, raising the level of the work of the mass of general practitioners, will lower it. I suppose a man may be forced to do good work, but he can be encouraged to do much better work, and that is the method I believe the Commissioners should adopt if they have the interests both of the people and the doctors at heart.

Dr. T. Cuming Askin (Woodbridge) writes: Mileage is a matter of vital importance to us, and we must insist upon a very substantial increase in our capitation payment, even should it unfortunately and most unfairly mean a diminution in the fees of the town doctors. It is just as

well for the latter to bear this in mind, so that they can induce the Government to establish a central fund to deal with mileage in accordance with your excellent suggestion, and thus make sure of receiving their 7s. or 7s. 6d. in full. The work of the doctor in town is child's play compared with that of the country doctor. His patients live more or less in a row, and he experiences little if any difficulty in sending serious and troublesome cases to hospital. If a consultation be required, even when the patient is unable to pay an adequate fee, a kind *confrère* is always willing to come to the rescue. But what about the doctor in the country? The nearest hospital may be eighteen miles away; the nearest doctor eight or nine.

Special and night visists are a serious thing when they involve a journey of four, five, or more miles. And it is not simply a case of distance. Many of our patients live off the beaten track. If it is necessary to leave the practice for even the short space of twenty-four hours a locumtenent has to be provided and paid for. The shortest illness will also render this necessary. It is true in the past we have had contract patients living three and more miles away, and we have attended them for a ridiculously small sum because they were poor, but there has been no compulsion about it, and we have known that at any time we could make a change if desired. Our patients have also known this, and the knowledge has done much to save unnecessary calls, etc. This liberty—our greatest asset—will now vanish. The compensation must therefore be very real.

The cost of drugs and dispensing will be relatively greater to us than to the chemists, because of the necessity of ordering small quantities at a time, and owing to carriage. The very great expenditure of valuable time must also be taken into account, so that it is absurd to talk of dispensing as a privilege which is to be a set-off to mileage.

Whatever decision we come to, we cannot possibly agree to supply surgical and medical appliances for an inclusive fee of 8s. 6d. or 9s.; nor can we be responsible for such extras as fractures, dislocations, anaesthetics, serums, vaccines, tuberculin, oxygen, bacteriological examinations, and consultations. Quite apart from the financial aspect of the case, we must think of the freedom and independence of the medical profession.

Proposed Referendum.

Dr. John D. Davies (Swansea) writes: I would submit that it is urgently necessary that a referendum should be taken in each Division, and answers asked to the following question:

Are you in favour of accepting the terms offered by the Government?

A large majority of the profession do not attend the meetings of our Divisions, so that it is hardly fair to conclude that the voice of a meeting is necessarily the voice of the Division.

It is very evident that if we arrange terms with the Government, the fight will then be beginning, as the difficulty will be with the uninsured. Attempts will be made all over the country to form medical aid associations for the treatment of these. In Swansea and other places the friendly societies have convened meetings to consider the question, and one of the leading lights at one of the meetings warned the members that they must put their feet down, to prevent the doctors attempting to constitute the sum fixed by Government as a standard for the uninsured. This would have the effect, of course, of completely annulling any benefit from an increase in the rate for insured persons, and we should have the increased work required by Mr. Lloyd George's conditions.

Another question might be added to a referendum:

If you are in favour, but the majority of the profession decide against accepting, do you pledge yourself to fall in with the majority?

The Wage Limit and a Pooling System.

Dr. T. S. Finch Hudson (Tipton) writes: I practise my profession in a working-class neighbourhood for a living, and I believe that, with a proper adjustment of fees and wages to suit each particular locality, an entirely efficient medical service could be established with the money Mr. Lloyd George has at his disposal. Simply pay for work done; this would benefit doctor and patient alike, by giving most attention to serious and chronic cases and abolishing the hateful club system. Naturally, the country doctor must have larger fees than the town doctor; the man also who makes many night visits, and so shortens his life, should be paid handsomely for his sacrifice. Leave the adjustment of fees and of wage limit to the profession, and let the profession in return guarantee that the total for the whole country shall not exceed 9s. a head; if the amount is less, set aside the balance for a year of exceptional sickness, when 9s. may be exceeded, or pool the balance or loss each year, as the case may be. With regard to Mr. Lloyd George's remarks on the fact that in the year 1905 a vast majority of medical men considered 6s., to include drugs, was sufficient, it should be pointed out to him that this proposal was coupled with a low wage limit and medical examination before admission.

Income Limit.

Dr. W. G. Tottenham Posnett (London) writes with regard to the income limit: The following fact will show how we must hold out on the income limit. A patient of mine employs many hands at piece-work; they earn on an average £7 a week each. These men have joined various societies and stamp their own cards every week, as they say they may as well get whatever benefits there are under the Act, and besides which they might have to pay income tax if they cannot produce a card. Swindling the Chancellor of the Exchequer through his own Act!

We have the battle in our own hands, and, if we stick together and insist on our cardinal points, they must be conceded, or the Act falls to the ground. One cannot make bricks without straw, and we are the straw in this brick.

Dr. W. T. Freeman (Reading) writes: It occurs to me that one way of meeting the wage limit difficulty might possibly be that the Chancellor's last offer should be accepted in the case of insured persons earning £2 a week and under, and that insured persons earning more than £2 a week should themselves pay an additional 6d. per quarter.

Another grievance does not appear to be removed. As I understand the bill, any person that has been insured for five years and upwards will always be able to receive medical benefit, no matter what his income has ultimately become.

The Interpretation of "Income Limit."

Dr. Samuel E. Johnson (Moseley, Birmingham) writes: I have just seen in writing the decision of the Insurance Commissioners in a case where a clerk earning £3 a week, was also earning £40 per annum in his spare time, namely, that such person must be insured under the Act. The following explanation was given: "Where a person is employed by more than one employer each employment should be considered separately."

It appears to me that from the point of view of the medical profession this decision is one which may seriously affect them, as it follows that a person earning £150 per annum from four different employers, that is, £600 in all, will be able to receive the medical benefits under the Act in return for the very paltry contribution paid for same.

Mileage.

Letter from the Chancellor of the Exchequer.

We have received the following correspondence from the Secretary to the Insurance Commissioners:

[*Copy.*]

Gillingham, Dorset.
October 24th, 1912.

Sir,

In your statement to the Advisory Committee made on October 23rd it is clear that you are offering the same capitation fee to country practitioners as you are to those practising in a town. This is obviously unfair. For instance, a town doctor could look after a thousand patients within a two or three mile radius of his surgery, and could do the whole of his work on foot or with occasional hiring. A country doctor would be compelled to keep a motor or a trap and a couple of horses to do the same amount of work, his radius

being from six to eight miles. It appears that you do not consider it to be a matter of practical finance to allow an extra sum for mileage. On the other hand, you say that, "as far as the rural districts are concerned, the drug problem does not arise between the doctor and the chemist—in very few of them are there any chemists available, and therefore the doctor will have to provide his own drugs. . . . The rural doctor will be in a better position than the town doctor as far as the drugs are concerned. On the other hand, he will be in a worse position as far as the distances are concerned which he has to travel to see his patients."

I live in a small country town of some 3,400 inhabitants, with a radius of six or seven miles. There are two chemists here. Of course, there are thousands of other country towns similarly placed. As I shall have to hand over 1s. 6d., or possibly the extra 6d. in addition, to the chemist, you will see, from the above extract from your own statement, that I shall be unfairly treated as compared to my town brother, who has practically no mileage, and almost equally so compared to the doctor in the outlying village.

I feel confident that the vast majority of country doctors, *most of whom practise in small country towns*, will strongly resent this. I would therefore ask you the following, practically based on your own statement: Would you be ready to allow the country town doctor to receive the total of 9s., as you would do to his village *confrère*, and allow him to do his own dispensing as hitherto, even though there may be two or three chemists in the town? This might, perhaps, to some extent repay him for his mileage.

As a member of the Provisional Committee for the Dorset Branch of the British Medical Association, I should be extremely gratified to have as early a reply to this letter as possible. I think it might be a powerful incentive to doctors to come to an agreement with the Government proposals, and to remove a sense of great injustice at the flat rate being applied to country doctors.

I cannot but think that you would be willing to give this matter your gravest consideration.

With your permission I should be glad to publish this letter and your answer in the BRITISH MEDICAL JOURNAL.

Yours faithfully,

(Signed) R. W. MORGAN, M.D., B.S.

The Right Hon. Lloyd George,
Chancellor of the Exchequer.

House of Commons,
30th October, 1912.

Sir,

I am directed by the Chancellor of the Exchequer to advert to your letter to him of October 24th, and to state that there is nothing to preclude the arrangements made under the Act from being such as to meet the points which you raise, both as regards mileage and as regards the supply of drugs.

On the question of mileage, it is true that no part of the new grant which Parliament will be asked to make is specifically ear-marked from the outset for this purpose, but this does not prevent such an arrangement from being made. The Government considered the possibility of ear-marking part of the grant for mileage, and for other "extras," but found great difficulty in the way of so doing. Had the British Medical Association responded to the Chancellor's invitation of June the 26th to appoint a committee to negotiate with him, it might have been practicable to ear-mark an appropriate portion for special purposes, including mileage, as they would have been able to give him some assistance in arriving at adjustments which would be generally acceptable to the medical profession.

In the absence of such assistance, and having regard to the great difficulty of providing any efficient check upon "mileage" and other "extras" except by the co-operation of the profession, the Government considered it better, while providing a sum for medical remuneration which would fully cover the cost of all attendance given by the general practitioner (including any suitable provision for mileage and any "extras" that form part of medical benefit) not to attempt to ear-mark any portions of the fund for specific purposes. The Chancellor clearly indicated, however, that the distribution of the sum so provided, and the assignment of special portions to special purposes, would be largely a matter for the medical profession. Any proposals on the subject which appear to command the general support of the profession will receive most favourable consideration from the Insurance Commissioners and the Insurance Committees.

On the question of the provision of drugs in rural districts, the Chancellor desires me to point out that the provision of drugs will be placed in the hands of the doctor whenever the patient has not convenient access to a chemist, which would usually mean in a rural area, where there was not a chemist within a mile of the patient. In the case of the country town, which you instance, although doubtless the insured persons resident in the town itself would be supplied by the chemists carrying on business in the town, arrangements would presumably be made for the doctors to provide medicines for those who resided in the rural districts outside the town.

Yours faithfully,

(Signed) E. A. GOWERS.

THE PARLIAMENTARY COMMITTEE ON PROPRIETARY MEDICINES.

ON October 24th Mr. G. S. Paternoster, assistant editor of *Truth*, continued his evidence, giving the Committee further information with reference to the methods of vendors of secret remedies. He discussed in some detail the advertisement of "cures" for alcoholism and the tobacco habit. One of these, on behalf of which it was claimed that it could be used without the patient's knowledge, contained sugar of milk and tartar emetic, the latter being a poison scheduled under the Poisons Act. Apparently, however, this could be sold broadcast, and no authority made any attempt to stop its distribution. Quacks making a speciality of complexion cures, Mr. Paternoster remarked, did almost the largest amount of advertising of any. One of these recently promoted a "lean" cure, but this proved unsuccessful. Apparently there was less money in making lean people fat than in making fat people lean. With regard to dental institutes, the witness referred to the fact that many of these bore the name of a lady of title. He stated that these ladies were paid for the use of their names. Replying to the Chairman, he said that a member of the peerage lent his name to a concern of this kind, and in conversation with him (the witness) on the matter, remarked: "What was I to do to make a living? The only thing was to go into the quack medicine line of business." The witness did not suggest that all persons of more or less distinction whose names appeared in advertisements received payment. During his twenty years' connexion with *Truth* there had been few libel cases against that journal in respect of its campaign against proprietary medicines. A good many writs had been received, but the matter usually ended there.

The Chairman: Have you expressed yourself in *Truth* as freely as you have here?—Rather more strongly. (Laughter.)

Continuing, Mr. Paternoster said it was surprising how many testimonials were obtained by proprietary medicine vendors. He believed those who wrote them genuinely believed that they had been cured. He added that he had found no indications of real scientific knowledge behind the much-advertised remedies he had examined.

The Chairman: The effect of your evidence is to show that there is an almost inexhaustible field of folly in which any clever scoundrel can almost certainly reap a rich harvest?—That is so.

As to possible reforms, the witness suggested a full disclosure of the active ingredients of the medicine, and that for the protection of the public pocket it should be an offence to publish a misstatement with reference to the contents or effects of any preparation.

In reply to Mr. Bathurst, the witness said that undoubtedly the passing of more stringent laws with regard to quackery in the United States had led to a great influx of vendors of various nostrums in this country. The only way to stop this was to have similar restrictions here. He agreed that an international agreement whereby the restrictions could be made uniform in all countries would be very desirable. He did not agree that it would be safer to prohibit the advertisement of any remedy claiming to

cure a disease which the medical faculty declared to be incurable. It would be unfair to deny the possibility of a layman discovering something that might be of value in this respect.

Professor Cushny, M.D., F.R.S., Professor of Pharmacology at University College, London, gave evidence on behalf of the Therapeutical Section of the Royal Society of Medicine. He divided proprietary medicines into three classes: (1) those that were directly injurious — for example, preparations of acetanilide; (2) preparations which were useless because they contained no active ingredients; these were indirectly injurious because they encouraged delay; and (3) medicines whose effects were not objectionable, but for which special properties were claimed which they did not possess; widely advertised aperients were in no way superior to the preparations of the *British Pharmacopoeia*. The witness also mentioned that there was an objection to the legitimate proprietary preparations which were protected or registered under a number of different names. The remedy for the widespread use of proprietary medicines which first of all suggested itself was the education of the public. The Royal Society of Medicine thought it hardly fair that this should be left entirely to the medical profession. With the exception of the work done by *Truth* and one or two other organs, there was very little done to educate the public on this question. The second direct measure he advocated was that the contents of the preparation should be stated on the label, and that the claims made should have some relation to the qualities possessed by the ingredients. If the labels were made a warranty, a satisfactory constancy of composition would be obtained also. The protection of the registered name of a proprietary medicine, in his opinion, should be limited as in the case of a patent, and not go on from generation to generation. It would be an advantage if the publishers of the *British Pharmacopoeia* would do something to popularize the various simple remedies of which the formulae appeared in that work. He could not make any definite suggestions as to how this was to be done or how the education of the public in regard to secret remedies was to be advanced.

Mr. O'Grady: Do you think the publication of the ingredients on the labels will have much effect?

The Witness: *A priori* I should not have thought it would, but in the United States it appears to have had a very marked effect.

Mr. Glyn Jones: Is the practice of using the old-fashioned household remedies decreasing?—I think it is.

Is that regrettable?—In my experience I should hardly regret some of them going out.

Mr. Glyn Jones: Is that a reminiscence? (Laughter.) Do you think it would be an advantage for the public to have some therapeutical knowledge?—I think it is a pity they have so little. They should be informed of everything they can possibly grasp. I think medical knowledge should be much more widely distributed than it is.

The Chairman: How, in your opinion, will the Insurance Act affect the sale of proprietary medicines and the general question of self-medication?—One hopes that the doctor, being made easily available, will be called in, instead of self-medication being adopted.

EGYPT AND THE SOUDAN.

Lord Kitchener, in his report on the administration and condition of Egypt and the Soudan in 1911, refers to one or two matters in connexion with public health.

Hospitals.

There has been a continuous extension of hospital work during the year and a great increase in the number of attendances. The total attendances for ophthalmic aid numbered 236,000. The new permanent ophthalmic hospital at Assiut is in full working order, and other institutions of the same kind will be opened during 1912 at Mansura, Bens-Suef, and Zagazig. That at Mansura is nearly completed. These ophthalmic hospitals are being erected all over the country. Though reforms in this direction can only be gradual, ophthalmic work is being extended to all the rising generation, and a system for the supply of first aid in cases of acute ophthalmia is to be introduced in the villages as soon as a sufficiently expert staff can be trained.

Infant Mortality.

The small reduction in infant mortality observed in the previous year was not maintained. The deaths occurred chiefly among children under 4 years of age. They are due to violent fever and diarrhoea, which have fatal results before assistance can be given, and want of care and sanitary surroundings are the causes assigned. In each village there are at present one or two barbers, possessing some rudimentary skill, and it has been arranged that these men shall go through a short course of training, either in the Markaz hospital, or under direction of the Markaz doctor, and such of them as do not show proficiency in learning the elementary work of a hospital assistant will be replaced by others. After this course the men will be sent out to their villages under the supervision of the Markaz doctor, and will be supplied with the more ordinary medicines, including some appropriate to infantile diseases. These medicines will be put up in proper doses, so that in cases of critical illness they can be administered at once by the hospital assistant as a first aid until a doctor can be warned. The dispensary thus established will be free to the inhabitants, and close touch will be established between the staff of the Markaz hospital and the villages. The barbers are not intended to be medical practitioners, but they will be taught to carry out simple duties efficiently, and, in particular, to conform to the instructions of the authorities of the eye hospitals in cases of ophthalmia. Steps are also being taken to give some regular training of a similar kind to the midwives, one of whom is to be found in each village.

Plague.

There was an increase in the number of declared cases of plague from 1,238 in 1910 to 1,656 in 1911; the mortality was slightly over 60 per cent., as compared with slightly under 50 per cent. in 1910. The increase was due to the severity of local outbreaks rather than to any great extension of infected areas, as the number of localities infected was only 151, as compared to 177 in the previous year. The number of pneumonic cases was 178, a slight increase as compared with 1910. These cases were practically confined to Upper Egypt. The increase was due to a severe bubonic and septicaemic outbreak at Kom Ombo, an estate consisting of land recently reclaimed from the desert. As it is brought under cultivation a mixed population of the lowest classes is recruited from the neighbouring districts, and this fact, combined with the lack of organization in a new community, no doubt presented conditions which favoured an outbreak of the severest kind. In general the plague inspectorate staff has been increased, and improvement has taken place in consequence in village discipline and in the rapidity and accuracy with which information is obtained. A special service of investigators has been established with a main research station at Assiut, in charge of Dr. Petrie, who has had considerable experience on the Plague Commission in India, as well as in China and Manchuria.

School of Medicine.

Twenty-seven students gained the diploma of the School of Medicine in 1911, and fifty new students were admitted.

Soudan.

The health of the Soudan during 1911 was excellent, and no serious epidemic occurred, with the exception of an outbreak of epidemic pneumonia at Zeidab. The provision of a small infectious hospital is one of the most pressing needs for Khartoum. A large portion of the Lado has been investigated in regard to sleeping sickness and the "fly areas" mapped out; much credit attaches to Captains Drew and Thompson, R.A.M.C., in this connexion. The Kala-Azar Commission has done valuable work under Captain Marshall, R.A.M.C.

Dr. J. M. Jackson, President of the American Southern Medical Association, has appointed a commission to study the means of preventing malarial fever. The chairman is Dr. Charles F. Craig of Washington, and among the members is Dr. W. S. Thayer of Baltimore.

British Medical Journal.

SATURDAY, NOVEMBER 2ND, 1912.

THE COUNCIL'S REPORT ON THE PRESENT SITUATION.

THE ordinary quarterly meeting of the Council of the British Medical Association was summoned for 10 a.m. on Thursday, October 31st, when, after the transaction of some formal business, the Council proceeded at once to the consideration of the present position of the profession in relation to the provisional Regulations[1] issued by the Insurance Commissioners under date October 1st and the proposals made by the Chancellor of the Exchequer, on behalf of the Government, in his speech to the Advisory Committee on October 23rd,[2] and in his answer to Sir Philip Magnus's question in the House of Commons on the same day.[3] It will be observed that, in reply to a question by Mr. Worthington-Evans on October 28th, Mr. Masterman said that the modifications in the provisional Regulations to carry out the changes rendered necessary by the announcement of the Chancellor of the Exchequer were being drafted. He also stated that if the total cost of drugs in any district exceeded the total money available during the period of contract with the Insurance Committee, including the sum provided by the 6d. for each insured person which is divisible between the doctors and the chemists (if the total cost is between 1s. 6d. and 2s.), the bills would be discounted on some agreed system.

The Council had before it a draft report prepared by the State Sickness Insurance Committee. This report consisted of three parts: the first related to the action taken by the State Sickness Insurance Committee since its appointment by the Annual Representative Meeting at Liverpool last July; the second consisted of a statement comparing the provisional Regulations as to medical benefit with the cardinal principles of the Association, and with decisions on the State Sickness Insurance Committee, as to matters which should be included in the Regulations. In this part of the report the statement of the Chancellor of the Exchequer on October 23rd was analysed. The third part of the report discussed the present position of the medical profession in relation to the National Insurance Act and the future action which the Association should take.

The whole subject was debated at length in connexion with this draft report, which was discussed paragraph by paragraph. The discussion was still proceeding when it was necessary to send this part of the JOURNAL to press, but special arrangements having been made, the full text of the Report of Council to the Divisions and Representative Body will be found, with certain appendices, in the SUPPLEMENT for this week.

We believe that all the members of the Association fully appreciate the seriousness of the present position, and that they will study the report now issued as a preparation for attending the meetings of the Divisions which will be held during the next fortnight. We understand that arrangements for meetings in many Divisions have already been completed, and that in others an announcement of the date and place of meeting will shortly be made. We can only again appeal to every member of the Association to make arrangements to enable him to attend the meeting of his Division. Under the constitution of the Association, it is only by such personal attendance that a member can effectively express his views and influence the policy of the Association.

[1] SUPPLEMENT, October 5th.
[2] SUPPLEMENT, October 26th.
[3] BRITISH MEDICAL JOURNAL, October 26th, p. 1158.

HEREDITY IN RELATION TO INSANITY.

AMONG the factors in the advancement of social progress one of the most powerful is the popularization of medical science. In the general diffusion of knowledge of the laws of health lies the hope of the formation of an intellectual atmosphere in which superstition and imposture cannot live. By means of it people are enabled to co-operate intelligently with the doctor—a matter of the greatest importance in regard to the success of treatment. Moreover, the popularization of medical science "makes for righteousness," to use Matthew Arnold's phrase, in the broadest sense. It not only impresses on the mind the dangers of self-indulgence and evil living, but, by teaching how man's mental outlook is influenced and his actions determined by his physical constitution and his environment, it creates that large understanding which is the source of sympathy and of active helpfulness. To fulfil this purpose, however, not only must the scientific gospel be sound in substance, but it must be preached by the right men and in the right way. More harm than good is likely to be done by platform orators and writers of catchpenny books. The popularizer should be a master of his subject, who has himself enlarged the domain of knowledge, and who lives on the peaks above the clouds of self-advertisement. Such a one may be trusted not to utter claptrap and not to disfigure truth by covering it with cheap decorations. An example of the best kind of popularizer is Dr. Mott, whose additions to knowledge in neurology and insanity give him the right to speak with authority, while he has a gift of exposition which enables him to make difficult subjects clear to the intelligent lay mind.

Among the social problems that most urgently call for solution at the present time is the prevention of insanity and the treatment of the feeble-minded. To the discussions on this question Dr. Mott has made many contributions of the highest value from the practical as well as the scientific point of view. One of his most fruitful researches has been on the relation of heredity to insanity—a subject of fundamental importance in regard to the prevention and treatment of mental disease. In its remote consequences insanity is a peculiarly insidious menace to the welfare of society; in its immediate effects it is a heavy burden on the much suffering ratepayer. Therefore, it is well that public attention should be called to the direction which scientific research is taking in the endeavour to discover its causes, and to the conclusions to which that research seems to point. There was a deep truth in Robert Lowe's cynical remark when the democratic spirit began to assert itself, that we must educate our masters. There was a special appropriateness, therefore, in an address delivered by Dr. Mott to members of the London County Council on June 26th. It is gratifying to note that the address was so much appre-

ciated that it has been printed for the Asylums Committee and issued as a pamphlet. We hope it will be widely read, for in these days of eugenic enthusiasm there is a danger that people may be carried away by false or doubtful doctrines into hasty action. Here we can only indicate a few of what seem to us to be the most important points of Dr. Mott's teaching.

He has made a close study of a number of pedigrees of persons suffering from various forms of mental disease, and the results go to confirm the truth of Maudsley's conclusion: First, that a person does not inherit insanity, but a predisposition or tendency; and, secondly, that the tendency comes from the stock. The unsound strain need not show itself in the stock in any form of actual insanity; it may appear in some allied nervous disorder, in hypochondriasis, in suicide, in feeble-mindedness, in dipsomania, in epilepsy in one or other of its manifold forms, and other periodical nerve storms, in eccentricity, in religious fanaticism, in the melancholic suspicious temperament, in selfish cunning, avarice, and meanness. In this investigation of pedigrees the patients were selected, not because they showed a large number of members of the ancestral stocks as being degenerate or insane, but because a complete family history for three generations could be obtained. Analysis of the total number of 3,188 cases, made up from 1,450 families, showed that in the insane offspring of insane parents daughters were much more numerous than sons; and amongst insane members of the same family (brothers and sisters) sisters were more numerous than brothers. This preponderance of females should be correlated with the fact that there are more women in asylums than men. The reasons assigned for the greater liability to insanity in women are summarized as the physiological emergencies connected with reproduction and the less stable equilibrium of the woman's nervous system. Dr. Mott adds as an important—in many instances, perhaps, the only—cause, the enforced suppression by modern social conditions of the reproductive functions and the maternal instincts in women of an emotional temperament and mental instability. For purposes of comparison, Dr. Thomas investigated and compiled the pedigrees of some 32 of Dr. Mott's hospital patients admitted for various diseases. There were in these pedigrees 1,000 living representatives and 250 dead. There were 8 who had been in asylums, and in 8 others there were records of fits. The pedigrees of two of these patients furnished nearly all the cases of insanity and epilepsy. One was suffering from neurasthenia, and in the pedigree were members who had suffered from epilepsy, migraine, insanity, hysteria, deafmutism, and imbecility, suggesting a neuropathic taint in the ancestry. The other suffered from exophthalmic goitre, and there were several neuropathic members in the stock. Dr. Mott ascertained that a far greater number would be found in the stocks of any 32 insane patients. Certain forms of mental disorder—such as epilepsy, recurrent and delusional insanity—are much more likely to be transmitted than others; they are transmitted in the same form, or more frequently in some other indicative of the neuropathic taint.

In considering the question of marriage, a study of the relatives and pedigrees has convinced Dr. Mott of the importance of looking back into the stock and ascertaining whether there are many lines of defective heredity and whether with some such lines there are others of sterling worth. "For often enough" (he says) "with insanity and epilepsy we find great talent and civic worth, and even genius." The chances of insanity occurring in the offspring are much greater when there is a dual neuropathic inheritance.

Dr. Mott points out, however, that now and then, even from an apparently unknown or even bad stock, a great man arises. We have no right, he states emphatically, to say that because a parent is insane the children must necessarily be insane or useless to the race. This should be a warning to the eugenists not to allow themselves to be carried too far by their zeal for the betterment of the race, or there is a chance of their reducing mankind to a dead level of dull mediocrity. In rooting up the weeds they run the risk of destroying the flowers. It is significant that almost every man of genius of whose ancestry anything is known should have had a trace of neuropathy in himself and a history of nerve disease of one kind or another in his relations. Experiments of breeding in the human subject have mostly been failures. The attempts of Frederick the Great's father to "propagate procerity," as Dr. Johnson said, resulted in offspring not exceeding the average standard of height. A systematic experiment in human stirpiculture was made in the Oneida community in Central New York. The object was primarily the increase of sanctity in succeeding generations. The offspring—such as survived—though "on the whole somewhat above the outside average in physique and intellect," showed no sign of special sanctity. The failure of these experiments should give the eager eugenist pause. Even if we succeeded in rearing a race of tall men and women, there is no certainty that their brain power would be commensurate with their stature; and a nation of stupid giants would not be so efficient either as citizens or as fighting men as persons of ordinary development of mind and body.

At present the feeble-minded and other undesirable members of the population breed far more freely than the classes who form the backbone of the nation. It is evident that if no restriction is placed on the propagation of the unfit, the result must be degeneracy of the race. Fortunately for the human race there is always a tendency to regression to the normal average of the species operating with natural selection. Nature if left to herself prevents the multiplication of the unfit by increasing their susceptibility to disease in successive generations, and thus in time exterminating them; or, in accordance with the law of "anticipation," the onset of the disease is hastened and the unsound members of the stock are weeded out before they can transmit the baleful inheritance. This natural process of elimination has, however, now been to a large extent neutralized by the concentration of effort on the preservation of life without taking thought of the race. The advance of hygiene, with all its beneficial results, has brought in its train the disadvantage that it preserves, and tends to preserve still further, the least desirable elements of the population. Hence the weeds of civilization are growing in even ranker luxuriance and threaten to choke such good seed as there is.

What, then, can be done to check the decay of the race? It has been suggested that the surgeon's knife is the instrument of social salvation. The unfit of both sexes, it is urged, should be sterilized. Enactments legalizing this method of dealing with the matter exist in several States of America, but the most eminent authorities, such as Professor Davenport, referred to by Dr. Mott, hold that further investigation is required to justify the practice. At the International Congress of Eugenics, held in London last summer, it was stated by Mr. Bleecker van Wagenen,

who presented the report of the Committee of the Eugenic Section of the American Breeders' Association, that "the sterilization laws already enacted in the United States would have to undergo vigorous attacks in the highest courts before compulsory operations were performed, with the probability that there would eventually be material modifications of them."[1] For our own part, however, we feel strongly with Professors Bateson, Karl Pearson, and Arthur Thomson that we are still too much in the dark about the laws of heredity and about mental deficiency to justify so drastic a measure. Moreover, public opinion in this country is not ripe for such an experiment, and it may be confidently asserted that in the light of such knowledge as is at present available no proposal in that direction would receive the sanction of Parliament. We fully agree with Dr. Mott that what has to be done is to educate the public conscience in regard to the responsibility of parenthood, encouraging the propagation of the fit and discouraging the propagation of the unfit. Congenital imbeciles should be segregated, now that Nature's stern method of elimination is counteracted by the agency of man. But in dealing with those who come under the very vague definition at present possible of feeble-mindedness the greatest caution is required. Indiscriminate sterilization of men in whom the sexual desire would still burn with uncontrolled fierceness, and of women who would inevitably be the prey of the voluptuary, would cause the most disastrous evils to society. Restriction of marriage would lead to increase of propagation of degenerate children bearing the further stigma of illegitimacy. Moreover, any legislation of that character would be received with suspicion: the cry of one law for the rich and one for the poor would be raised. We commend the following weighty words of Dr. Mott to the attention of all social reformers: "I often think that a number of people who are crying out about the monetary burden of supporting the unfit are themselves not doing their duty to the race. Many have no children or they restrict the births. Moreover, one does not find the numbers in the family increase with the income. When hereditary health—as shown by longevity, fertility, and mental stability in a stock—is regarded as a greater asset for happiness in the family and the nation than hereditary wealth, then will be the time for the rich and comparatively prosperous to suggest the desirability of sterilization of the pauper imbecile and insane. For no one supposes that it would be carried out in all classes."

X-RAY BURNS AND MALINGERING.

A FULL report has recently been published in a German contemporary of a clever trick played upon the staff and students of a hospital by a hysterical girl.[2] She was the daughter of a gardener, and a housemaid by vocation, and five years ago, when 14 years of age, she was admitted into hospital in Munich, and the vermiform appendix was removed. That structure showed little evidence of disease. She was discharged at the end of seventeen days. Within a few months, according to the patient's account, vague abdominal pains set in, with nausea and, on more than one occasion, faecal vomiting. In the summer of 1908, in July, 1909, and in March, 1910, exploratory abdominal operations were performed. The catamenia appeared in September, 1909, and the flow was said by the patient to be very free. She underwent curetting, but the scrapings proved to be portions of normal endometrium. In September, 1910, she returned to the Munich hospital and has been under observation there ever since. She stated that she suffered from severe menorrhagia, constant sacral and abdominal pains, and great agony during defaecation. Yet she looked in good health. The *x*-ray treatment was tried on account of the uterine haemorrhages, as it had proved satisfactory in other cases in the hospital. After four sittings all seemed well, and the skin of the abdomen showed no lesion of any kind, not even slight pigmentation or reddening. Unfortunately, one day in July last year, the patient was brought before a large class, the rays were applied and the necessary precautions explained. The danger of burns, about which the girl had not previously heard, and the frequency of that complication, were impressed on the students, but, unfortunately, they also impressed themselves on the patient. Three days later she declared that the last application of the rays had caused slight burning pains, and that an ulcer had appeared on the right side. Dr. Hirsch discovered a necrotic ulcer as big as a florin, a burn of the third degree on the lower border of the cicatrix of the incision made for the removal of the appendix. It was the first "burn" ever observed in a patient under treatment in the *x*-ray department of the hospital, and before the fifth or public sitting there was not so much as a trace of temporary erythema. The ulceration extended, and Dr. Hirsch publishes a photograph showing sores all over the abdomen up to the inframammary region. The patient was sent to the skin department, where she was closely watched, and the ulcers healed perfectly. Then malingering was suspected, and the patient ultimately admitted that she had applied a brown fluid (commercial hydrochloric acid) supplied by a neighbour. Doubts were now raised about the uterine haemorrhages, and by means of an occlusive pessary, applied during two successive periods, it became clear that the blood which stained the patient's underlinen was not of menstrual origin. The abdominal pains had evidently been to a great extent imaginary. The patient had deceived several physicians and surgeons who had seen her independently of each other. Hirsch believes that, when she gets the chance, she will forsake the out-patient department of the Munich hospital and manage to earn sympathy on false pretences elsewhere, even at the price of a second curetting or a fifth laparotomy.

[1] BRITISH MEDICAL JOURNAL, August 3rd, 1912.
[2] G. Hirsch, *Monatsschr. f. Geburtsh. u. Gynäk.*, September, 1912, p. 335.

THE CULTIVATION OF MALARIAL PARASITES.

THE school of tropical medicine of the medical department of the Tulane University, Louisiana, which is under the direction of Dr. Creighton Wellmann, recently sent an expedition to Panama to study the cultivation of the malarial parasites *in vitro*. The expedition consisted of Dr. Charles Cassedy Bass, Assistant Professor of Tropical Medicine and Hygiene, and Dr. Foster Mathew Johns, Assistant in the Laboratories of Tropical Medicine and Hygiene. Dr. Bass had already succeeded in cultivating the plasmodia, but many details remained to be elucidated and confirmed. The expedition proved that the malarial plasmodia could be grown in human serum, in Locke's fluid (from which calcium chloride was omitted), and in human ascitic fluid. It was found that in the majority of cases dextrose must be added to the medium to secure satisfactory growth. It was ascertained that the most favourable temperature for the cultivation was about 40° C. Positive cultures were obtained from 29 cases of aestivo-autumnal malaria, 6 cases of tertian, and 1 case of quartan. Cultures were carried on for four generations from the parent culture before the expedition left Central America, and it is thought probable that it will be possible to maintain them indefinitely. The expedition was made possible through the kindness of a friend of the school, who remains anonymous. The United Fruit Company, which had already contributed £5,000 towards the

expenses of the school, placed their steamships and other equipment at the services of the expedition free of charge. Colonel W. C. Gorgas, chief sanitary officer of the Panama Canal zone, and members of his staff placed all the material of the hospitals there at the disposal of the expedition.

PROPOSED MEMORIAL TO DR. BUSTEED.

To every one who takes an intelligent interest in India the name of Busteed is well known as that of the author of that fascinating record of Indian life of a past generation, entitled, *Echoes from Old Calcutta*. Brigade Surgeon Henry Busteed, C.I.E., formerly in the medical service of the Honourable East India Company, died early in the present year, at the age of 78. A letter bearing, among other well-known signatures, those of Lord Curzon of Kedleston, Lord MacDonnell, and Sir Henry Mortimer Durand, has appeared in the press, in which it is said: "Those who were in India during the last quarter of the nineteenth century, and all who are interested in the stirring tale of the rise of British power in that country, must be sensible of the great debt due to Dr. Busteed for the sagacious and indefatigable researches which he conducted into the history of 'Old Calcutta,' for the light which he threw upon the life and conversation of our countrymen in that city, and for the graphic pictures drawn by his careful pen of one of the most momentous periods in the growth of our Indian Empire, the days of Warren Hastings and Impey, of Francis and Clavering, and Madame Grand. It is not too much to say that Dr. Busteed rediscovered 'Old Calcutta' and brought again to life a crowd of interesting figures who once trod that famous stage." The writers add that it is felt that some memorial of him should be placed in the premier city of India, which he loved so well, and which owes so much to his inexhaustible knowledge and untiring erudition. It is hoped that it may be possible to place a bust in the Victoria Memorial Hall in Calcutta, which is now in course of erection, and will, when completed, be the National Gallery and Valhalla of India. Contributions will be received in England either by Sir James Bourdillon, Westlands, Liphook, or by Messrs. Richardson and Co., 25, Suffolk Street, Pall Mall; and in India by Messrs. Grindlay and Co., Calcutta.

THE TITLE OF ARCHIATER.

The recent death of the physician to the Pope, Dr. Giuseppe Petacci, whose official title was "Archiatra Pontifico," recalls the "Archiatri Palatini" of ancient Rome. According to Withington, the first who bore the title in Rome was Xenophon, chief physician to Claudius. He is said to have been the last Asclepiad. Then came Andromachus, physician to Nero, and the inventor of a famous theriac or antidote. After Andromachus the title was borne by Demetrius and Magnus under Antoninus Pius and Marcus Aurelius. The title is not purely Roman, as it is applied in inscriptions to the physicians of Eastern kings, such as Mithridates of Pontus. It may possibly even be traced to Egypt, where the title "chief physician" was very common, and was applied to the most ancient known practitioner of medicine. Under Alexander Severus, and especially under Diocletian, physicans who had the good luck to bask in the sunshine of the imperial favour could hope for almost any dignity, and their children were exempt from all taxes and public duties. They were placed in the higher ranks of the imperial hierarchy. Gibbon says: "In this divine hierarchy (for such it is frequently styled) every rank was marked with a most scrupulous exactness, and its dignity was displayed in a variety of trifling and solemn ceremonies which it was a study to learn and a sacrilege to neglect. The purity of the Latin language was debased by adopting, in the intercourse of pride and flattery, a profusion of epithets which Tully would scarcely have understood and which Augustus would have rejected with indignation. . . . All the magistrates of sufficient importance to find a place in the general state of the Empire were accurately divided into three classes: (1) The Illustres; (2) the Spectabiles, or respectable; and (3) the Clarissimi, whom we may translate by the word 'honourable.'" There were titles of inferior dignity, such as Egregius and Perfectissimus. In fact the Emperors, as they gathered all power into their own hands, sought to pacify and perhaps delude the officials who held semblance of authority by high-sounding titles. This showed a great knowledge of human nature, and even at the present day titles which have lost all trace of any meaning they may ever have had have a distinct value in other markets besides Vanity Fair. The Archiater of imperial days seems to have ranked sometimes among the "Spectabiles," sometimes in the lower grade of "Perfectissimi." Their president had the title of Count. The highest offices in the State were not beyond the reach of a lucky doctor. Vindicianus, a medical practitioner, was Proconsul of Africa, and another member of the profession, Ausonius, father of the poet, was Prefect of Illyria. These were not isolated instances of the height to which medical men could rise under imperial favour. The title was continued by the Popes, and a history of the pontifical Archiatri by Gaetano Marini was published at Rome in 1784. Among them was the famous Guy de Chauliac, author of the *Chirurgia Magna*, who was Archiater to Clement VI at Avignon. The Archiatri Palatini must not be confused with the Archiatri Populares. The latter were State doctors, of whom a certain number were allotted to each city according to its population. They corresponded to the public physicians of Greek cities. The privileges which Augustus had bestowed on the whole profession were restricted by Antoninus to five or ten physicians in each city, according to its size, who were elected by the municipality and neighbouring landowners, and who in the reign of Constantine had acquired the title of Archiatri Populares. At Rome it was not till A.D. 378 that an archiater was appointed by decree of the Emperor Valentinian for each of the fourteen districts of the city. They were allowed to carry on private practice, and in addition to attendance on the sick poor they had to teach the art of healing to pupils. The imperial edicts, says Withington, direct that the greatest care should be taken in their election, which was preceded by some sort of examination; but they do not seem to have had any control over the profession generally, and, as in ancient Greece, the practice of medicine was open to anyone. The institution, however, doubtless had a favourable influence on medical education.

A FORGOTTEN POET-PHYSICIAN.

Few probably now read the poems of Dr. Mark Akenside, yet, in his own day, this well-nigh forgotten poet not only enjoyed considerable popularity, but also received the commendation of one who, although an acknowledged master of the same art, was not likely to err on the side of generosity. When the manuscript of Akenside's *Pleasures of Imagination* was submitted to Dodsley, that publisher, thinking the price of a hundred pounds—which was demanded by the author—somewhat high, submitted the work to Pope, who, having looked into it, advised him not to make a niggardly offer, "for this was no every-day writer." Accordingly, the poem was published in 1744, when its author was only 23 years of age, and ran through a good many editions. Akenside was born in 1721 at Newcastle-on-Tyne, and at the age of 18 began the study of theology at Edinburgh, with a view to becoming a Presbyterian minister. Two years later he abandoned this intention and went to Leyden, where, after three years' study, he obtained his doctor's degree in medicine. On his return to England he set up at Northampton, but, finding no scope there, owing to the great popularity of a previously established practitioner, he removed

to Hampstead, and thence, after two years, to London. In London his poetical fame seems to have proved serviceable to him: he found a generous patron in a Mr. Dyson, who allowed him £300 a year. But for this timely aid it is to be feared that the poet-physician would have fallen on evil days; for, although there is reason to believe that he was a zealous and competent practitioner, such professional success as he enjoyed seems to have been rather of an academic than a financial nature. The practice of medicine appears to have had a depressing effect upon the rival muse, for as time went on his poetical effusions diminished, both qualitatively and quantitatively, their place being usurped by dissertations upon dysentery, the origin and use of the lymphatic vessels, a method of healing white swellings of the joints, and similarly prosaic topics. However, he published two collections of odes, and made considerable progress with a new version of *The Pleasures of Imagination*, which, nevertheless, remained incomplete at the time of his death. That his professional attainments were above the average is indicated by the facts that he became physician to St. Thomas's Hospital and to the Queen, and delivered the Goulstonian lectures in anatomy, and, in 1759, the Harveian oration. In 1770, in his forty-ninth year, his career was brought to an abrupt close by a "putrid fever" at a time when it seemed in a fair way to be crowned by increased repute and prosperity. As a poet Akenside, in the twenty-six years that followed the appearance of his first poem, not only did not surpass but failed to maintain the level of that production. "His great work," says Dr. Johnson, "is *The Pleasures of Imagination*, a performance which, published as it was at the age of 23, raised expectations that were not amply satisfied. It has undoubtedly a just claim to very particular notice as an example of great felicity of genius and an uncommon aptitude of acquisitions of a young mind stored with images and much exercised in combining and comparing them. . . . His images are displayed with such luxuriance of expression that they are hidden, like Butler's Morn, by a 'Veil of Light'; they are found fantastically lost under superfluity of dress. The words are multiplied till the sense is hardly perceived; attention deserts the mind and settles in the ear. The reader wanders through the gay diffusion, sometimes amazed, sometimes delighted; but, after many turnings in the flowery labyrinth, comes out as he went in. He remarked little and laid hold on nothing." This is excellent, if somewhat severe, criticism. Johnson goes on to praise Akenside for the skill displayed in his versification, which is indeed remarkably fluent and musical. "In the general fabrication of his lines he is perhaps superior to any other writer in blank verse." On the other hand, he has hardly a good word for the later poems. "When he lays his ill-fated hand upon his harp, his former powers seem to desert him. . . . Of his odes nothing favourable can be said." *The Pleasures of Imagination* is not an easy poem to quote from. It maintains throughout almost the same unvarying level—a high one, certainly, but monotonous in effect, for lack of the vivifying shock of an occasional uprush of the divine afflatus. It could hardly have been of himself that Akenside was thinking when he wrote:

> The high-born soul
> Disdains to rest her heav'n-aspiring wing
> Beneath its native quarry. Tir'd of earth
> And this diurnal scene, she springs aloft
> Thro' fields of air, pursues the flying storm,
> Rides on the volley'd lightning thro' the heav'ns,
> Or, yoked with whirlwinds and the northern blast,
> Sweeps the long track of day.

On the other hand, the following description of the joy that attends a convalescent's first outing augurs well for the tact and sympathy of the future physician:

> Fair the face of Spring
> When rural songs and odours wake the morn,
> To ev'ry eye; but how much more to his
> Round whom the bed of sickness long diffused
> Its melancholy gloom! how doubly fair
> When first with fresh-born vigour he inhales
> The balmy breeze, and feels the blessed sun
> Warm at his bosom, from the springs of life
> Chasing oppressive damps and languid pain.

PITYRIASIS ROSEA.

The abnormal summer of 1912, whatever its effects on farm produce in this country, has not much affected the annual crop of pityriasis rosea in at least four of the larger skin clinics in London. Most cases occur between February and May, but autumnal cases are not at all uncommon. It is one of those diseases which once seen is not necessarily remembered, and its diagnostic importance, in view of its comparatively harmless nature as compared with that of a luetic roseola, can hardly be overestimated. Syphilis is probably never mistaken for pityriasis rosea, but the converse is by no means the case. The distribution of the eruptions in the two diseases roughly corresponds, and it is this feature which is perhaps responsible for the mistakes that are sometimes made. Neither rosea nor roseola is common on the face, and the former practically never occurs on the scalp, hands, or feet, and is rare below the elbows and knees. It tends usually to radiate from the axillae or groins on to the chest, upper arms, abdomen, and thighs in front, on to the shoulders, back, loins, and buttocks behind. The history of a "herald patch" (the *plaque primitive* of Brocq) is a valuable hint to the diagnosis when the patient volunteers the information. In both diseases the patients are usually young adults, and in both diseases the sex incidence is about equal. In pityriasis the rash is always macular in type, but the size and colour of the spots, the presence of rings with a brownish or yellowish centre, and the presence of pruritus, are all variable features, and in the diagnosis the greatest stress should always be laid on the following five points: (1) The superficiality of the lesions; it is very difficult to feel them. (2) The absence of enlarged glands, especially of the nuchal and epitrochlear. (3) The absence of throat trouble and marked headache. (4) The general condition of the patient, who is usually in no worse health than if he had ringworm. (5) The presence of the very typical macule, with its dry, scaly covering or ring and its pale brownish, or yellowish, easily wrinkled centre. With a lens every lesion is seen to be scale-topped from its incipience, and even in pinhead-size lesions the scales can be appreciated. In the ring type the scales are at the periphery, forming a "collarette," with the lace points directed to the centre. It is important to note that the scales are very fine and dry, not greasy, as in seborrhoeic dermatitis, or adherent *en masse*, as in psoriasis, or of late appearance, as in the roseola of syphilis. They are best seen in an early case, and may completely disappear as the rash grows older, so that a case of five weeks' duration requires very careful investigation. Where there is the slightest doubt a Wassermann reaction is called for. On the other hand, it should be borne in mind that (1) a secondary syphilide is infiltrated and usually palpable, and very often of a coppery hue; (2) typical enlarged hard glands in the groins and neck, etc., are contemporaneous with or precede the rash; (3) throat symptoms are very rarely absent and severe headaches quite common; (4) a patient with syphilis is ill, anaemic, and very frequently feverish; (5) scaling, not very commonly present in a roseola, is always a late feature—that is, it becomes more obvious as the rash fades—the scales are not characteristic. Where there is the slightest doubt recourse should be had to the Wassermann test. Pityriasis rosea may be confused with seborrhoeic dermatitis, but a glance at the scalp, and the greasy scales and the tendency to follicular grouping in the latter condition, should prevent error.

In treating the eruption, tar baths, a 2 per cent. ichthyol ointment or paste, or calamine lotion will be found most useful in cases where pruritus is a feature; for a rapid cosmetic result, exsiccation by frequent application of salicylic alcohol (1 per cent. to 70 per cent.) and dusting powders is the best treatment.

KIAMIL PASHA.

This week it has been announced that at the very height of the war troubles the Turkish Ministry has gone out of office, and that Kiamil Pasha has become Grand Vizier or head of the Cabinet. It is ill policy to swap horses when crossing a stream; but if any one, writes a correspondent, is well calculated to justify such a change, that man would certainly seem to be Kiamil Pasha. Apart from his great experience and well-known abilities, he possesses a peculiar capacity for seizing upon essential points and reconciling conflicting opinions. Our correspondent had an opportunity of observing this faculty when attending a formal discussion over which Kiamil Pasha was presiding. The subject was what steps should be taken in the event of an outbreak of plague, and there were some fifteen speakers, ten of them medical men and the rest civilian and military Turkish officials. The medical men represented nearly every European nation and many different schools of thought, while the Turkish officials also had various conflicting opinions on administrative methods and other aspects of the question. Each expressed his opinion in turn, the languages used being French, Italian, Greek, English, and Turkish, and throughout Kiamil Pasha sat silent. Watching him as he sat back in his chair, with one foot drawn up under him, playing with a string of beads, and occasionally turning to place his seal on letters which were brought into the room for his signature, it might well have been concluded that he was paying no attention whatever to the matter. Indeed, the only evidence to the contrary was that as each speaker ceased he raised his eyes and nodded a signal to some one else present that his view was sought. But when each of the debaters had had his say, it became evident that Kiamil Pasha had not missed a word or thought, despite the multiplicity of languages used and the greater or less amount of scientific knowledge which some of the medical speakers paraded. In a short speech he succinctly brought out the principal contention of each speaker, considered how far their various views tallied, and finally sketched a fashion in which a practical policy could be based upon them. The promptness with which he separated the wheat from the polyglottic chaff and seized upon all the essential points was a lesson in clear thinking, while his review of the speeches was evidence of a remarkable memory, considering how long the sitting lasted.

MEDICAL LATIN.

The prophetic soul of Dr. Charles J. Whitby, dreaming of things to come, foresees[1] an organization for the regeneration of society of which the medical profession is to be the nucleus. As its activities will become cosmopolitan, "it will agree," he says, "as to the adoption of some universal language." This does not necessarily follow, by the way, but it is certain that it would be well if it did so agree. "The claims of Esperanto," Dr. Whitby goes on, "will, no doubt, be considered, but I am inclined, upon the whole, rather to advocate the revival of Latin." We have ourselves for years advocated, not the revival of Latin—for it is not dead—but its employment as the international language of science. Dr. Rolleston, in his inaugural address on Universities and Medical Education—an abstract of which appeared in the Journal of October 5th—also referred to the want of a universal language, as shown by the construction of artificial substitutes such as Volapuk, Esperanto, Ido, Neutral, and by the movement for the adoption of a simplified form of Latin as an international language under the name of "Latino." As Mr. Micawber said of "gowans," we are not exactly aware what Latino is; but we think that while we are about it we might as well learn Latin, as for instance it is used for lectures and debates in Roman Catholic Colleges. A difficulty in the way is that Latin is falling so much out of common knowledge that it is sometimes successfully used, as all language is, according to Talleyrand, as a means of concealing thought. A French paper recently told the following story, which may quite possibly be true. Some years ago a French ship in quarantine in the roads of Mauritius was visited every day by the medical authorities. Friends of the passengers, journalists, and privileged members of the public, took the opportunity of going out in the little vessel that carried the sanitary authorities, and conversing at a distance with those confined on the ship. One day the ship's doctor indulged in a little joke to relieve the weariness of quarantine. He confided to an inquiring reporter the news that a case of "pigritis" had just occurred on board in the person of one of the officers as the result of having nothing to do. It was pitiful, he said, to see the unhappy man, but he assured the reporter that all necessary precautions were being taken. The same evening a local newspaper solemnly announced that a fulminating case of pigritis had occurred on board the vessel. The next day the sanitary inspector came on the scene. In reply to his anxious inquiry the ship's doctor informed him that the case was fairly serious. The patient had little appetite and was suffering from great muscular depression. Asked if he feared contagion, the doctor said he feared the whole ship's company would be attacked. When this became known it caused great alarm in the town. A large stock of disinfectants was ordered. The inhabitants talked of nothing else. "Just think," they said to each other, "a new disease hitherto unknown in Mauritius. But these infernal epidemics of hot countries! There is always something new being discovered in that line!" Next morning there was a special meeting of the council of health. It was proposed to take strong measures. Luckily one of the members remembered that *piger* is the Latin for lazy, or "pigritis" might have been included among notifiable diseases; a bacteriologist would then have discovered the microbe, and doubtless a new vaccine would have been prepared. There have been frequent occasions to note in reports of meetings and so forth sent for publication how closely the members of our profession resemble Shakespeare in having "little Latin." Since the agitation about the Insurance Act began the changes have been rung on such forms as *per capitem* and *per capitam*. But these do not scratch Priscian's head so badly as caught *in flagratio, infertilis masculinus* (apparently intended to denote male infertility) which we have recently come across in leading medical journals of the United States. Better "Latino," or even Esperanto, than this kind of thing.

[1] *The Doctor and his Work*. London. 1912.

LONDON SCHOOL OF TROPICAL MEDICINE.

The annual dinner of the London School of Tropical Medicine was held on Wednesday, October 23rd, at Princes' Restaurant, General Sir Reginald Talbot in the chair. Among those present were Lord Sheffield, Sir Ronald Ross, Sir Ernest Shackleton, Sir Francis Lovell, Fleet Surgeon P. W. Bassett-Smith, Professor W. J. Simpson, Professor R. Tanner Hewlett, Dr. F. M. Sandwith, Dr. A. J. Chalmers, Dr. J. W. Barrett, Dr. G. C. Low, Dr. Purves Stewart, Dr. C. W. Daniels, Mr. Herbert Read, Mr. R. B. Carter, Mr. J. Cantlie, and Mr. P. Michelli. After the usual loyal toast, in which allusion was made to the recent gracious donation of £100 by the King, had been duly honoured, Sir Ronald Ross proposed the toast of the London School of Tropical Medicine. He said that the school had obtained money, but

he did not think it had received enough from the capital of the Empire; indeed, Liverpool had given more than London. He paid a compliment to Mr. Joseph Chamberlain and Mr. Austen Chamberlain for their work in connexion with the school, and said that some of the officials of the Colonial Office were working for the cause of tropical medicine in a manner that could not be too highly praised. The Chairman, in acknowledging the toast, referred to Mr. Chamberlain as the greatest Colonial Minister this country had ever had. Altogether 1,240 students had passed through the London School. The Board of Education now recognized the school and had under consideration the question of a grant for a more complete course of sanitation and hygiene. The International Congress of Medicine had for the first time established a Section of Tropical Medicine. The principal event of the year, as far as the school was concerned, was the legacy of £10,000 from Lord Wandsworth. In conclusion, the Chairman appealed for greater support for the school. Sir Patrick Manson, who also responded, said they expected that in a very short time they would have a school with very much better accommodation than the present institution possessed. The realization of this hope had been made possible by the generous help of a number of distinguished public men, including the Lord Mayor and Mr. Lewis Harcourt. He also bore testimony to the work of Mr. Austen Chamberlain and the Colonial Office. It had long been in contemplation to make efforts to enlarge the scope of the teaching in tropical hygiene and sanitation. He strongly recommended the responsible authorities to consider a scheme for teachers in these subjects. He hoped that a scheme of pensions would be established, so that men engaged in the work of tropical medicine would not be persuaded away into other walks of life. In regard to research during the past year, he referred to Dr. Wenyon's expedition to Bagdad and Asia Minor for the purpose of solving some of the mysteries of Oriental sore. One point he had established was that this disease could be acquired and yet not show any clinical manifestation until five or six months after the period of infection. This Dr. Wenyon had done by inoculating himself with the virus of the disease, and he was therefore to be ranked as one of the martyrs of science. Dr. Bahr's expedition had resulted in a great deal of precise knowledge. He had brought out one new point of interest in pathology—namely, that the passage of a germ through an intermediary host sometimes resulted not only in the modification of the pathological properties, but also in the biological habits of the germ. Dr. Bahr had now gone on another expedition to Ceylon to study sprue, a disease of enormous importance to tropical colonies. Dr. Leiber was about to proceed, as interim Wandsworth Scholar, to West Africa to study parasitic diseases. Next year the Wandsworth Scholarship would be open, and would offer a magnificent opportunity for an ambitious man.

LECTURES AT THE ROYAL COLLEGE OF PHYSICIANS, LONDON.

THE Bradshaw Lecture on the diagnosis and treatment of incipient pulmonary tuberculosis will be delivered by Dr. D. B. Lees at the Royal College of Physicians, London, on Tuesday next, and the Horace Dobell Lecture on insect porters of bacterial infections by Dr. C. J. Martin, Director of the Lister Institute, on November 21st. The FitzPatrick Lectures, by Dr. Raymond H. P. Crawfurd, will be delivered on November 7th, 12th, 14th, and 19th; the subject of the course is echoes of pestilence in literature and art. The first lecture will deal with the great Antonine plague, the second with the black death, the third with the great plague of Milan, and the fourth will continue the history down to the end of the eighteenth century; the second and third lectures will be illustrated by lantern slides. The lectures will be delivered at 5 p.m. on each day.

MEDICAL HISTORY.

WHAT is practically a society for the study of medical history has been established in London after many years of hesitation and delay. It starts under good auspices as a section of the Royal Society of Medicine, and the first meeting will be held on Wednesday, November 20th, at 5 p.m. Similar societies have long been in existence in the United States, in Germany, and in France, with the happiest results. It is intended to give a wide interpretation to the term "medical history," and it is hoped that exhibits will be a feature of the meetings. There will also be an educational aspect, and one or more lectures will be delivered annually by recognized authorities on the subject, and all practitioners and medical students will be at liberty to attend them. Those who wish to join the new section, which already contains 128 members, should communicate with the honorary secretaries of the section at the Royal Society of Medicine, Wimpole Street, W.

SIR PATRICK MANSON had the honour of being received by the King on October 26th, when His Majesty invested him with the insignia of a Knight Grand Cross of the Most Distinguished Order of St. Michael and St. George.

MR. CHARLES ALFRED BALLANCE, M.V.O., M.S., F.R.C.S., Surgeon to St. Thomas's Hospital, has been appointed by the Home Secretary to be Chief Surgeon of the Metropolitan Police in succession to the late Mr. Clinton Dent.

THE case of Stevens *v.* the British Medical Association terminated on Thursday afternoon in the disagreement of the jury.

Medical Notes in Parliament.

National Insurance Scheme.

Medical Benefit.

ON October 28th Mr. Worthington-Evans asked a series of questions with regard to medical benefit.

He asked first whether it was intended to repeal the Regulations, dated October 1st, 1912, now in force as to the administration of medical benefit under Clause 28, in which the cost of drugs and appliances was made a first charge on the amount available for medical treatment.

Mr. Masterman said that the necessary modifications in the regulations were being drafted to carry out the changes rendered necessary by the announcement of the Chancellor of the Exchequer.

Mr. Worthington-Evans asked how a man of the age of 65 and upwards, who had been a member for many years of a friendly society which had now become an approved society, could in future obtain medical attendance and treatment for which he had hitherto paid 1d. a week; and whether any part of the proposed grant of £1,650,000 would be applied in paying the increased cost of his medical attendance.

Mr. Masterman said that he was not aware of any reasons why the cost of medical attendance of the persons referred to would be increased by the operation of the Act or the proposed new arrangements.

Mr. Worthington-Evans then asked whether if it were found that that was the general anticipation of the friendly societies some part of the grant would be given to those old people who otherwise would cease to get medical benefit.

Mr. Masterman said he had no control over the grant, but would inquire into the subject.

Mr. Worthington-Evans asked out of what funds drugs and appliances to be provided in connexion with medical benefit under the National Insurance Act were to be paid for if their average cost in England equalled the average cost in Germany, say 3s., and thus exceeded the 1s. 6d., or possibly 2s., per person allowed for in the scheme recently announced by the Chancellor of the Exchequer.

Mr. Masterman said: The conditions attaching to the sale of drugs, the articles required to be supplied, the persons

able to claim them as part of benefit, in Germany differ so widely from the conditions in this country, that it is impossible to institute any useful comparison between the two. If the total cost of drugs in any district exceeded the total money available during the period of the contract with the insurance committee (including the sum provided by the 6d. for each insured person which is divisible between the doctors and chemists, if the total cost is between 1s. 6d. and 2s.). the bills would be discounted on some agreed system; but all evidence in this country shows that except in cases of abnormal sickness (which are to be met by a special fund) the cost is far below the sum available.

Sir H. Craik asked if the remuneration of the doctors for their scientific work would be dependent on a chance increase in the cost of drugs? Mr. Masterman replied in the negative. The doctors would receive a certain amount as a fixed sum. Beyond that sum there was sixpence, which was available between doctors and chemists in accordance with the amount of drugs prescribed.

Sir H. Craik: It will vary? Mr. Masterman: To the extent of sixpence.

Mr. Hills asked the Chancellor of the Exchequer (1) what provision he proposed to make to secure adequate medical attendance and treatment, as provided by Section 15 (2) of the Act, for cases requiring more than could be afforded by a practitioner of ordinary competence; (2) whether his attention had been drawn to the fact that under the regulations of the Insurance Commissioners, dated October 1st, 1912, the cost of any consultation with a second doctor would fall upon the medical practitioners upon the panel collectively, since the amount available for their collective remuneration would be diminished by the consultant's fees; whether he really intended thus to discourage the recourse to a consultant in grave cases which, in order to secure the adequate treatment which the Act provided required a consultant; and (3) whether the regulations made by the Insurance Commissioners, dated October 1st, 1912, contemplated provision only of such medical treatment as could be undertaken by a practitioner of ordinary competence; and whether this was a breach of Section 15 (2) of the Act, which contemplated treatment adequate to the disease whatever its gravity.

In a written reply Mr. Masterman said that the regulations referred to had been drafted in compliance with the provisions of the Act, and fully carried out the intentions of Parliament. Full regard had been had in calculating the amount available for the provision of medical benefit under the Act, to the various forms of treatment referred to, in so far as they fell within the scope of medical benefit under the Act.

Doctors and Friendly Societies in Ireland.

Mr. Devlin addressed the following long question to the Chief Secretary for Ireland:

Whether his attention has been called to a meeting of Dublin medical practitioners held under the presidency of the President of the Royal College of Surgeons, at which resolutions were adopted to the effect that every doctor practising in Dublin should be requested to sign a pledge not to accept service with any insurance or benefit society or any medical appointment unless the local medical committee were satisfied that the payment was an adequate remuneration, and that every city doctor who is a medical officer to any benefit society of whatever kind be required to make a demand on his society for such rate of remuneration as the local medical committee shall consider proper, and, if such be not granted, he must resign his office, and no practitioner shall be allowed to take it, and that a black list be formed on which the names of practitioners who refuse to sign the pledge shall be placed, such list being published in the medical colleges, and it to be understood that everyone who appears thereon shall be boycotted by means known to the medical profession; whether, seeing that this resolution is an infringement of the law as advocating intimidation, he will order a prosecution where it can be shown that, in consequence of pressure brought to bear on medical practitioners by the local medical committee appointed at the meeting referred to, such doctors who had undertaken work for friendly societies or insurance committees resigned their appointments; whether he will consult the Irish law officer as to whether licensing corporations in Ireland have power to remove from their registers the names of medical practitioners who refuse to recognize the authority assumed by the Dublin medical committee; and, if not, will he take steps to protect medical practitioners who are prepared to work for friendly societies or to undertake the administration of the National nsurance Act in Ireland?

Mr. Birrell replied that the resolutions actually passed at the meeting referred to were not quite accurately set out in the question. He was advised that the resolutions and pledge were not in themselves illegal, and that the licensing corporations in Dublin were not in any way controlled by either the resolutions or the pledge. The Government was not aware that any doctor had been removed from any register for refusing to recognize the views of the Dublin Medical Committee. If there should be anything which amounted to an infringement of the law the question of what action should be taken would be considered.

In answer to a somewhat similar question put by Mr. Devlin on the relations between Dublin medical men and friendly societies, Mr. Lloyd George said that he was aware of the resolutions passed at the meeting of September 24th, which, however, related to the licensing corporations and not to the General Medical Council. He understood that the General Medical Council had always held that it could not deal with questions of remuneration, and in any case its decisions were open to review in the courts.

Tuberculosis Cases in London.

Mr. Touche asked the President of the Local Government Board how many persons suffering from tuberculosis, and entitled under the National Insurance Act to sanatorium benefits, had been provided for by the London County Council; and how many cases were waiting for accommodation. Mr. Burns said that, according to figures supplied to him on October 26th, the London Insurance Committee had recommended 114 insured persons for sanatorium benefit, and this they were receiving. He was not aware that there were at present any insured cases waiting for accommodation. On October 26th the Committee had forty-seven vacant beds available, in addition to the services of dispensaries.

Hospitals.

Mr. Fell asked whether the Insurance Commissioners proposed to take over the Brompton Hospital for Consumption; and if this was part of a scheme to take over all the hospitals in the country for the purposes of the National Insurance Act. Mr. Masterman replied that the answer to both parts of the question was in the negative.

Highlands and Islands in Scotland.

Mr. Cathcart Wason asked when the report of the committee appointed to inquire into the necessities of the Highlands and Islands under the National Insurance Act would be issued, and the Marquis of Tullibardine asked whether the committee was not intended to inquire not only into the medical service but into the necessities of the Highlands generally. Mr. Masterman, in reply, said that he believed that the reference had been narrowed to what was required under the National Insurance Act, but the committee were still investigating the wider question. He was unable to give an exact answer as to the date of the publication of the report. In reply to the Marquis of Tullibardine Mr. Masterman said that before finally settling with the doctors in the Highlands and Islands of Scotland the conditions under which they would work the Insurance Act the report of the committee would be awaited.

Women's National Health Association (Ireland).

In reply to Sir J. Lonsdale, Mr. Birrell said that the Local Government Board in Ireland had advised all county councils to make immediate arrangements for the treatment of consumptives belonging to their respective counties, and had not interfered in any way with the discretion vested in county councils of providing sanatoriums for the inhabitants of their counties either by establishing such institutions themselves or by entering into agreements with persons having the management of such institutions. The same principles of distribution would be observed whether a county council acted in concert with or independently of the Women's National Health Association. Responsibility for maintenance and upkeep of sanatorium buildings provided by the Women's National Health Association devolved on that association as occupants of premises held on trust for general

sanatorium purposes. The estimated amount of expenditure out of the sanatorium grant on Peamount was £17,945, according to particulars furnished to the Local Government Board by the architects and the Women's National Health Association. The expenditure at Rossclare was estimated to come to less than £1,700. Pending the completion of the institutions, and until an account had been taken between expenditure in respect of temporary provision and expenditure which permanently supplied contracting counties with beds, the exact cost per bed taken permanently could not finally be ascertained.

Mr. T. M. Healy asked whether each county would be entitled, if it required it, to an equal share in the Imperial grant. Mr. Birrell said that any county which contracted with any association would have charged against its share of the total grant the actual cost supplied out of the £25,000.

In reply to further questions, Mr. Birrell said that the counties which did not align themselves with the Dublin body would be entitled to the payment of an equal share on a population basis. The money had been doled out to the association on certificates of expenditure verified and examined by the Local Government Board.

Insurance Stamps.

In reply to Mr. Denwan, Mr. Masterman said that the sales of health insurance stamps during the first quarter amounted to a weekly average of 13,008,773.

Ireland and Medical Benefit.

Mr. John Redmond asked whether, in view of the additional grant which it was proposed to make in respect of medical benefit under the Insurance Act, he would consider the question of devoting a sum of money towards making good the cost of certificates for sickness and invalidity benefits in Ireland, and whether he was still of the view that the extension of medical benefit to Ireland was a matter to be decided by the wishes of the Irish people themselves. The Chancellor of the Exchequer said that he was taking the opinion of the Irish Insurance Commissioners upon the first point, and hoped soon to be able to make an announcement. As regards the latter part of the question, he had always made it clear that the question of extending medical benefit to Ireland was a matter entirely to be determined by the Irish people themselves.

Medical Inspectors (Ireland).—Mr. Mooney asked the Chief Secretary for Ireland what practical knowledge and experience the medical inspectors of the Local Government Board of Ireland possessed regarding the erection, equipping, and administration of sanatoriums and tuberculosis dispensaries; in what recognized sanatoriums and tuberculosis dispensaries in Great Britain or on the Continent they acquired their experience; whether, in view of the fact that the Local Government Board required a six months' special course for medical superintendents of sanatoriums and tuberculosis medical officers, he would state whether the medical inspectors of the Local Government Board had had a similar training; and, if not, whether the Local Government Board would afford their medical inspectors an early opportunity of obtaining such training? Mr. Birrell: The medical inspectors of the Local Government Board have been clearly associated with the erection and administration of sanatoriums established by public bodies in Ireland, such as Heatherside Sanatorium in county Cork, Crooksling Sanatorium to county Dublin, and the Abbey Sanatorium near Belfast. They have by personal inspection become familiar with the construction, arrangements, and methods of management adopted in other sanatoriums and tuberculosis dispensaries in Ireland, as well as in similar institutions in England and Scotland. There was no necessity for the medical inspectors to undergo the special course of instruction referred to, seeing that they were not, in the discharge of their duties, called upon to engage in the diagnosis and treatment of tuberculosis. Mr. Mooney asked why the Local Government Board required more efficiency in the superintendents than in their own inspectors. Mr. Birrell said it depended on the nature of the duty. It was one thing to consider the construction and arrangement of a sanatorium, and another thing to deal with this disease.

Sleeping Sickness.—Mr. Newdegate asked the Secretary of State for the Colonies whether he was aware that Dr. F. Mehnarto (Dr.Med. Heidelberg, Dr.Phil. Berlin) had recently infected and then cured animals of sleeping sickness by the injection of a serum; that these experiments were conducted under the personal supervision of Dr. Jolly, Professor of Physiology, of the South African College, Capetown; whether he was aware that Dr. Mehnarto also performed the same experiment on himself with successful results; and whether, in view of the fact that a Commission was in existence at present to try and find a remedy for sleeping sickness, which was costing the British Government a considerable sum of money annually, he would take steps to see that advantage was taken of the discoveries of Dr. Mehnarto in those colonies where sleeping sickness prevailed. Mr. Harcourt said: The director of the Tropical Diseases Bureau informs me that he has seen some papers briefly describing experiments performed by Dr. F. Mehnarto on rabbits for the cure of sleeping sickness, but that it was not possible for him to form an estimate of their value. It was stated in the papers that some of the experiments had been performed in Dr. Jolly's laboratory at Capetown. There was no mention of Dr. Mehnarto having performed similar experiments on himself. Before I can take steps to see that advantage is taken of the discoveries of Dr. Mehnarto, it is needful to ascertain whether these discoveries are of value, and I suggest that Dr. Mehnarto should bring his work before some scientific society or offer it to some scientific journal for publication. If it has the value which he appears to claim for it, there will be no difficulty in having it published and discussed by competent critics. When this has been done, I shall be glad to consider the matter further.

Royal Army Medical Corps.—In reply to Mr. Perkins, Colonel Seely said that the grant of furloughs to soldiers of the Royal Army Medical Corps rested, as in the case of other branches of the army, with the discretion of the commanding officer. Nothing was known at the War Office of any unusual curtailment during the present year, or of any necessity for obtaining five signatures in every case.

Post Office Staff Medical Services.—In reply to Mr. Cawley, the Postmaster-General said that the amount expended on medical services for employees of the Post Office during the last three years was approximately as follows:

	£
Year ended March 31st, 1910	54,700
Year ended March 31st, 1911	55,800
Year ended March 31st, 1912	56,400

Defective and Epileptic Children.—In reply to Mr. Acland Allen, the President of the Board of Education said that there were 318 separate education authorities in England and Wales; 147 had taken some action under the Elementary Education (Defective and Epileptic Children) Act in 1899. In fifty-one areas schools or classes had been established by the local authorities, and, in addition, schools or classes had been provided from other sources in eleven areas. With reference to the fourth part of the question, perhaps he might be allowed to refer the hon. member to the report of the Chief Medical Officer of the Board of Education for 1910. The matter he referred to was dealt with on page 208. The latest available figures showing the number of children in schools established under the Act were for the year 1910–11, and were as follows:

	Number of Scholars on the Register.	
	London.	Rest of England and Wales.
In schools for physically defectives...	3,036	1,677
In schools for mentally defectives ...	6,925	5,328
In schools for epileptics	—	377
Total	9,961	7,382

England and Wales.

[FROM OUR SPECIAL CORRESPONDENTS.]

MANCHESTER AND DISTRICT.

The Manchester and Salford Provident Dispensaries.

A good deal of doubt has occurred in Manchester and Salford as to whether the resignations which have been sent in referring to club appointments were resignations of the whole club, including the non-insured as well as the insured, or whether they only applied to attendance on the insured members of the clubs. It has been held that strictly and literally the wording of the form of resignation meant the resignation of the whole club appointment; but as it was undoubtedly the intention only to deal with the insured in this way, and to leave the question of attendance on the uninsured to be dealt with separately, some doubt has arisen in the minds of the medical officers of the Manchester and Salford Provident Dispensaries, some of them holding that they had intended to resign the whole appointment, while others claimed that they would be at liberty to go on attending the uninsured as formerly. Thus when the General Secretary of the Dispensary Association inquired which was meant, it was impossible to give any definite reply. In order to obtain a general agreement and combined action, a meeting of the medical officers was held last week at the Grosvenor Hotel, Manchester, and it was unanimously agreed to inform the General Secretary and all the local secretaries of the Provident Dispensary Association that the resignations applied to the whole appointments, including the uninsured as well as the insured. Further, it has appeared to the Provisional Medical Committees of Manchester and Salford that the present is a most favourable opportunity for dealing with the whole question of club practice for the uninsured. This was communicated to the meeting of the medical officers of the provident dispensary, who accordingly resolved to call on all the medical officers to refuse to enter into any new agreement with the Provident Dispensary Association for attendance on the uninsured, except through the Provisional Medical Committees. This is an extension of the work originally contemplated for these committees, but as they include both members and non-members of the British Medical Association, it has been thought that they were suitable bodies to deal with this general question.

Ancoats Hospital.

The annual report of the Ancoats Hospital again records a great increase in the work of the hospital. The number of accidents treated during the year 1911–12 was no fewer than 24,747, as compared with 23,890 in the previous year, and the out-patients 11,705, as compared with 10,547, while the in-patients were 1,538, as compared with 1,430. On the contrary, the home patients show a decrease from 1,710 to 1,402. Taking the whole work of the hospital, the report says that during the past ten years the number of out-patients and accidents has trebled, and it is a source of regret that so large a proportion of those who should be treated as in-patients had to be sent away owing to lack of accommodation. The financial position of the hospital continues to be a source of anxiety, for while the expenditure has been £10,407, the income is only £7,588, leaving a deficiency of over £2,800, though of this about £1,000 was for necessary repairs and alterations, and to a certain extent is abnormal. Thus, though the board feels that there is urgent need for further extensions, it is unable to take steps to meet the want, as the support given by the public is not sufficient to carry on even the present work of the institution.

CHESTER.

Medical Men and Municipal Affairs.

At a meeting of the Chester Town Council on October 23rd, Dr. A. Mann, the Chairman of the Public Health Committee, presented its report for the last time, and in acknowledging a resolution of regret at his decision to give up his work in connexion with the council delivered a short address, During his long tenure of office he had been much indebted to the present medical officer of health and other officers of the council. The Mayor had rightly said that the reputation of the city largely depended on the way in which the duties of its Public Health Committee were performed. A progressive sanitary policy was not possible without heavy expenditure. Twelve years ago the sanitary organization of Chester was ineffective and inadequate; it was still small, but was now thoroughly efficient and as well staffed as any in England. He regretted more had not been done towards the rehousing of the working classes. If the people throughout the country could be rehoused and the milk supplies adequately protected, tuberculosis, he believed, would be so materially diminished in twenty-five years that the many sanatoriums and tuberculosis dispensaries now being brought into existence would perhaps be objects mainly of antiquarian interest. The true enemies of tubercle bacilli were sunlight and fresh air, and these and a healthy decent home were the right of every man, whatever his wages, who did an honest day's work. At the present time there was a regrettable tendency to burden the health departments of the country not only with the prevention of tuberculosis, but also with its treatment. Preventive measures were rightly allotted to that branch of the medical profession formed by the medical officers of health, since they were men specially trained to devise and carry them out, but treatment fell within the scope of another branch of medicine, which was also specially trained for that purpose and quite capable of fulfilling it. Dr. Mann has been a member of the town council for the past twelve years, and during ten of them has been either chairman or deputy chairman of the Public Health Committee. He also represents the council on the Port Sanitary Authority. In 1904 he was sheriff.

Chester Infirmary.

The rebuilding operations now in progress at Chester Infirmary are to include the provision of a new operating theatre, the expenditure thereon being provided by the family of the late Mr. James Taylor as a memorial to him. Mr. Taylor was connected with the infirmary for some forty years, and at the time of his death was its senior honorary surgeon. The total amount required to complete the alterations and extensions of the infirmary is £40,000, of which sum £29,000 has so far been collected.

LONDON.

London County Council.

Medical Officer's Report on the Medical Treatment of School Children.

The Board of Education, in sanctioning the continuance until December 31st, 1912, of the present arrangements for the medical treatment of school children by the London County Council, made it a condition that the Council would forward a full report by its medical officer on the working of the scheme. This report has been prepared and issued to members of the Council. It describes in detail the growth of the present system, as to which particulars have appeared from time to time in the British Medical Journal since December, 1908. The difficulties that arose in connexion with treatment through the agency of the general hospitals, and the steps taken to overcome those difficulties, are related, and the report describes exhaustively the precise methods adopted at every hospital and medical treatment centre included in the Council's scheme. A statistical table appended shows that during 1911–12 provision existed for the treatment of 28,020 children, and that the number who attended the hospitals and centres was 27,647. The percentages of cases failing to complete treatment were 13.5 in eye cases (16,670 attended), 13.6 in ear, nose, and throat cases (9,814 attended), and 20.3 in ringworm cases (1,112 attended). Of the 10,188 children who were prescribed spectacles, 8,401 (or 82.4 per cent.) obtained them. Of the 9,814 children treated in the ear, nose, and throat departments, 5,674 were operated upon. In the course of his report the medical officer (Dr. W. H. Hamer) mentioned that the three special classes for myopic children in London were proving a marked success. Additional provision of this kind was needed, particularly in the east, south-east, and west of London.

BRISTOL.

Honorary Degrees.

In the list of honorary degrees conferred by the Bristol University published in the Journal for October 26th, p. 1162, the name of Dr. D. S. Davies, Medical Officer of Health for the City and Port of Bristol, who received the honorary degree of LL.D., was inadvertently omitted. Dr. J. Michell Clarke and Mr. F. R. Cross were also the recipients of the degree of LL.D.—not LL.B., as printed in the paragraph referred to.

Scotland.

[FROM OUR SPECIAL CORRESPONDENTS.]

A County Medical Officer of Health and Private Practice.

An interesting case has just been before the Ross-shire County Council regarding the position of the medical officer of health for the county, Dr. Bruce (Dingwall), relating to private practice in this district.

According to the minutes and correspondence submitted to the last meeting of the Ross-shire County Council it seems that the committee received in May last a representation from Drs. Adam, Duncan, and Pender Smith to the effect that they had occasion to believe that the county medical officer of health had entered into some form of agreement with another medical man for the carrying on of his consulting or other practice, and, further, that the county medical officer of health had not adhered to the terms of his appointment, as he had all along engaged in a visiting practice, paying visits in the season to patients residing in the hotels and houses of Strathpeffer, and also to patients residing in various parts of the county, without the invitation of other practitioners.

The appointment of county medical officers of health is regulated by the provisions of Section 52 of the Local Government Board (Scotland) Act, 1839, which *inter alia* enacts that the medical officer "shall not hold any other appointment, or engage in private practice or employment, without express written consent of the council." Under this provision the county council on October 7th, 1890, unanimously agreed—

> That Dr. William Bruce should be allowed to continue to act as medical officer of health of the Burgh of Dingwall, and to engage in purely consulting practice in medicine and surgery, giving advice only in his consulting-rooms in Dingwall and Strathpeffer, except when attending consultations on the invitation of other practitioners, but being bound to give work falling under his duties as medical officer of health of the county precedence of all other engagements.

The committee, after inquiry, expressed the opinion that the partnership complained of was against the terms of the appointment of the county medical officer of health, and that, unless it was departed from, they would have no alternative but to deal with the matter. With regard to the question of private visiting practice, they pointed out to the medical officer of health that the complaining doctors had stated that they were prepared to go into details, but before doing so wished to appeal to him as to whether he should not make this unnecessary. On June 18th last Dr. Bruce intimated that he had terminated his agreement with Dr. Douglas as from July 15th last.

A further representation was afterwards received from the complaining doctors to the effect that the medical officer of health had not enforced the usual stipulation in partnership agreements, as Dr. Douglas, whom he had brought to Strathpeffer as his partner, had made arrangements to continue in practice there. They further pointed out the omission from the medical officer of health's letter of any reference to their appeal with regard to their assertion that he had all along engaged in a visiting practice. In a letter addressed by Dr. Bruce to the members of the Public Health Committee he denied the charges, and submitted that the minute of the county council quoted above must be read in the light of what is understood by the term "consulting practice" in the medical profession, for it was by that he was guided when he accepted the appointment. He contended that a "consulting practice" literally and strictly confined to the four walls of one room is unknown in the profession; that it would be prejudicial to the interests of the patient and inconceivable to any one conversant with the conditions of medical work; and that there was a well-recognized meaning attached by medical men to a purely "consulting" practice. He stated that he had not taken up a family practice nor had he ever been at the call of the resident public; that he had endeavoured to abstain from advising a patient who did not come to him at the direction of a medical man, and to secure, in correspondence with his regular attendant, approval of the treatment suggested, and, in fine, that he had adhered to the essential spirit of the agreement, and had always endeavoured to obviate the possibility of his practice interfering with the efficient discharge of his duties as medical officer of health.

The committee held a further inquiry into the matter, and after hearing statements, and Dr. Bruce having expressed regret if at any time he had transgressed the letter of his agreement with the county council, recommended the county council to take no further action in the matter, on the distinct understanding that the terms of the agreement were hereafter observed. Further, the committee resolved to submit a copy of the agreement with the county medical officer of health to the Local Government Board, and to ask for its interpretation of the terms.

The Local Government Board in its reply states that the terms on which consent was given to Dr. Bruce to engage in consulting practice were clear and explicit. The words limited Dr. Bruce to seeing in his own rooms cases which had been sent to him by another medical man, or to meeting another practitioner in consultation. They did not admit of his visiting patients at the written request of some other doctor. In giving this view the Board expressed no opinion on the question whether or not Dr. Bruce has complied with the conditions on which he was appointed.

This opinion was communicated to Dr. Bruce, who made the following intimation to the County Council through the County Clerk:

Dingwall, October 11th, 1912.

My dear Sir,

I have received the copy of the communication from the Local Government Board which you kindly sent me. To save further discussion and to end an unpleasant matter, I beg to state that I frankly accept the interpretation of the Local Government Board upon the minute under which I hold the appointment of M.O.H. for the county.

Will. Bruce, M.D., M.O.H.

Edinburgh Royal Infirmary and the Insurance Act.

The following official communication has been issued by the clerk to the managers of the Edinburgh Royal Infirmary:

The managers believe that considerable misunderstanding exists in the minds of the public as to the meaning and effect of the resolutions arrived at by the board at the special meeting held on July 15th last. These resolutions were as follows:

1. That in present circumstances insured persons being entitled to medical benefits under the Insurance Act should not be treated in the out-patient department of the hospital except in accident cases, urgent cases, and suitable consultation cases.
2. That the honorary staff shall be entitled to exercise the option (recognized in private practice) to decline to meet any practitioner in consultation should such a course be considered advisable, but always provided that no patient shall be denied immediate advice or treatment if that be requisite on medical grounds.
3. That the question of investigating the circumstances of applicants for the benefits of the hospital by means of almoners or otherwise is one which will require time and care in consideration owing to its undoubted complexity. The managers will, however, give the subject their most careful attention in due course.

The first resolution is the one which has given rise to comment, and it is with regard to it that explanation seems especially required. As will be observed, it is only to apply to out-patient cases, with this important reservation, that in respect of these all serious, urgent, and proper consultation cases will continue to be attended without question as heretofore. In other words, there will be no change in the policy of the infirmary in the reception or treatment of persons coming to the institution, with the sole exception of those attending as out-patients whose injuries or ailments are of such a nature as could readily receive proper attention from the ordinary practitioner. This modification will involve no hardship on the working classes, who under the Insurance Act will be provided with ordinary medical attendance, nor will it in any way limit the usefulness of the institution. The greatest work of the Royal Infirmary is, of course, done through the in-patients in the wards, and as regards these the position will

be that as cases calling for hospital care they are, *ipso facto*, urgent cases, and will be admitted and treated as freely as in the past. All dependants of insured persons who are suitable cases will continue to receive the treatment as formerly.

With regard to resolution No. 2 it will be recognized that the interests of the patients are carefully safeguarded, while resolution No. 3 contains a promise to consider the question of instituting some method of inquiry with a view of preventing hospital abuse.

The managers are satisfied that these simple resolutions are only such as the great body of subscribers will unanimously approve of, and they are confident that the bringing of them into operation will neither form a hardship to the public nor lessen in any way the beneficent work performed by the institution.

Sir Thomas Clouston on Self-Control.

Sir Thomas Clouston gave a lecture in Dundee last week on public morals from the medical and scientific standpoints. In the course of his remarks he said the study of evolution was a dominating idea, and was affecting more or less every department of science. If life had gradually been evolved from the most minute form, then the conclusion was inevitable that men's minds were the result of evolution. Self-control was the keystone of the archway of life. In mental diseases, control was the first quality to be lost, and the last quality to be regained. Everybody knew that alcohol generally was the cause of crime; and everybody knew that the use of alcohol tended towards the loss of self-control. Alcohol in this country was unfortunately taken to a preposterously and dangerously large amount. Future measures must take into consideration the constitution of the brain. The doctor, clergyman, teacher, policeman, and others, would be needed to improve morals, and measures of prevention were better than punishment. Slums also should be abolished.

Ireland.

[FROM OUR SPECIAL CORRESPONDENTS.]

Local Government Board and Complaints against Medical Officers.

The recent sworn inquiry held by the Local Government Board into a complaint against Dr. Laverty, of Rathfriland, shows the evils that attend the present method of dealing with such complaints. As the result of the inquiry has not yet been published, nothing need be said about this particular case beyond that the midwife of the dispensary district laid before the guardians a complaint that Dr. Laverty had neglected his duties in attendance on three cases as medical officer of Rathfriland. As usual in these cases, solicitors were employed by the guardians, the nurse, and the doctor; the inquiry was public and the evidence was published in the local press. In meeting such complaints the doctor is in all cases put to considerable cost and trouble in vindicating himself, and, no matter what the verdict, a certain amount of opprobrium is sure to result from the mere fact that an inquiry is held. A case recently reported, where a woman swore that the doctor had introduced a button hook into her daughter's eye when examining it, and thus caused her to lose the eye, is an example of the absurdity of many of these charges. The Provisional Regulations for medical benefit provide that all complaints against practitioners shall be investigated in private by a board of seven, three of whom shall be medical men, and no solicitors are allowed to be present. As medical benefits do not apply to Ireland, these regulations will not come into force here; but might not a somewhat similar course be adopted by the Local Government Board when making an inquiry into a complaint against a Poor Law medical officer? The medical practitioners of South Down have sent a letter to the Local Government Board protesting against the position of Poor Law medical officers with regard to complaints as to their professional conduct. The letter points out that these complaints are often of a frivolous or malicious character, and made by persons unable to pay damages for libel or slander. It protests against such inquiries being held in public and the publication of the evidence in the press, and suggests that the presence of one or at most two members of the board of guardians would be quite sufficient to represent the interests of the ratepayers. The presence of solicitors is stated to be undesirable, and it is urged that questions involving matters of professional conduct can only properly be dealt with by a tribunal composed largely of the profession. It is to be hoped that this matter will not be allowed to rest until some change for the better has been made, and to this end it might be well that medical men in other parts of Ireland should consider the advisability of memorializing the Local Government Board on the lines of this protest.

Treatment of Tuberculosis in Ireland.

Last week the Conjoint Committee of the British and Irish Medical Associations published a model scheme which has been drawn up in accordance with the various resolutions which have been passed during the last few months at the various meetings of the Conjoint Committee duly reported from time to time in our columns. The following minimum scale of fees is recommended:

	s.	d.
(*a*) For filing up Form Med. 2, including visit, if necessary, and examination of patient	5	0
(*b*) Consultation with tuberculosis officer (including visit, if necessary)	5	0
(*c*) Quarterly reports...	5	0
(*d*) Consultation at doctor's residence or surgery ...	2	6
(*e*) Visit at patient's home	2	6
(*f*) Night visit (8 p.m. to 8 a.m.)	5	0
(*g*) Special visits	5	0

No special fees for injections of tuberculin provided by central authority.

(*h*) Beyond the first mile, 1s. per mile one way.

Remuneration for Domiciliary Attendance.

Left to local Medical Committee subject to minima:

Report ... ... 5s. 0d.
Visit ... ... 2s. 6d. with mileage.

No special fee for injection.

The following resolution of the Sanatorium Subcommittee is also included in this scheme:

> September 4th, 1912.—(*a*) That efforts be made to prevent the imposition on medical staffs of all voluntary hospitals and other charities of gratuitous medical work on behalf of State-aided patients. (*b*) That no tuberculosis dispensary should be opened, or beds provided, for treatment of those in receipt of sanatorium benefit at a voluntary hospital or infirmary, except on the condition that the organization is entirely independent of the voluntary hospital or infirmary; the accounts of the department being kept separate, and the services of all medical practitioners being paid for. (*c*) That every sanatorium, however small, should have a resident medical superintendent.

This raises the question whether the general hospitals should be recognized as capable of providing sanatorium benefits or not. At present a large proportion of the patients in the general hospitals throughout the country are suffering from tuberculosis in some form or other. At present—in the Dublin general hospitals, at any rate—a large proportion of the patients in the surgical wards are affected with various forms of tuberculosis (bone disease, tuberculous glands, renal tuberculosis, etc.). If these cases are to continue to be treated in the general hospitals some arrangement will have to be made whereby some return must be made to the hospitals for their maintenance, and a further sum must be set apart for the remuneration of the members of the medical staff who attend them. This immediately leads to a difficulty, as the majority of the hospitals in Dublin are supported by the charitable public. It has been suggested that special wards should be set apart for the treatment of these cases, and that separate accounts should be kept, so that the expenses of this department should not be included in the expenses defrayed from the subscriptions to the charity.

Domiciliary Treatment for Tuberculosis Patients.

At the last meeting of the County Meath branch of the Women's National Health Association the following resolution was passed unanimously:

> That we, the County Meath branch of the Women's National Health Association, earnestly beg the National Health Insurance Commissioners and the Local Government Board to reconsider their decision as to their refusal to allow the county and city Insurance Committees to give a certain sum weekly for nourishment to tuberculosis patients receiving domiciliary treatment. We wish to point out that if these patients had been recommended for sanatorium treatment they would have cost their Insurance Committee at least £1 per week; therefore, in common justice, they should receive a certain sum for nourishment certified as necessary by the tuberculosis officer, nourishment being an

essential part of the treatment, as drugs alone for persons who cannot themselves obtain suitable food are not as efficacious in effecting a speedy cure. That copies of this resolution be sent to the Irish National Health Insurance Commissioners, the Local Government Board, and the President of the Women's National Health Association.

ACADEMY OF MEDICINE IN IRELAND.

The President of the Royal College of Surgeons (Dr. R. Dancer Purefoy) took the occasion of the first meeting of the Surgical Section of the Academy of Medicine for this session to entertain the members of the Councils of the Royal College of Surgeons and of the Surgical Section of the Academy and other friends at a supper last week in the College of Surgeons.

Correspondence.

THE SECRET OF LIFE.

SIR,—The leading article on "The Secret of Long Life" in the JOURNAL of October 26th discusses in an admirable manner the principal points connected with long life. May I be permitted to say a few words on the subject as one who has occupied himself with it for sixty years and more? It was the occurrence of the premature death of some men in the midst of a very useful life, some who had only just begun to earn the fruit of hard work, some who had left their families in great distress, which had directed my attention in an early period of my professional life to the investigation of the causes which seemed to have brought on untimely death, and to the means by which this might be avoided; and I think I may say that this study has led to the prolongation of my own life and that of a large number of my patients. It is justly said in your leader that "the most essential thing is to come of a long-lived ancestry," and "that the habit of long life is engendered somehow, and is often transmitted to the descendants." This is very true; but I have convinced myself that long life may be obtained also by a great number of persons whose ancestry has not been long-lived by careful attendance to the laws of health; while, on the other side, many descendants of a long-lived ancestry may shorten their lives considerably by disobedience to these laws.

The tendency to early death is as inheritable as that to long life; it is, therefore, important to counteract this adverse tendency, and it is possible to do so in almost all cases to a greater or lesser degree. I could describe many instances to prove this, but for want of space I will restrict myself to my own case.

My father and my mother died in their 60th year. My father died of cerebral apoplexy; his family was gouty, and for several generations the cause of death was apoplexy or an allied affection of the brain between the ages of 68 and 75. They had all lived freely with regard to wine and food. My mother died from "dropsy" and effusion into the pleural cavities; she had had a weak heart and had suffered from frequent attacks of bronchitis. Her father and grandfather had died from "dropsy," and none of them had reached the age of 70 years.

My health, as a young man, was not robust. I had a poor digestion, and my muscular system was so weak that I was regarded absolutely unfit for military service. I felt that I had to fight the tendency to cerebral affections, from early disease of the blood vessels of the brain; and, besides, the tendencies connected with a weak fibre of the heart on my mother's side. I arranged my manner of living in accordance, especially by maintaining great moderation in eating as well as in drinking, and by taking much active exercise. The result is that I now in my 89th year enjoy very fair health.

I am sure that medical men can do much in prolonging the lives of their patients, especially those with a poor family history, by finding out the causes of the early death of the ancestors of their patients, and by adapting their advice about diet, physical exercise and work to combating the morbid tendencies, especially those to inheritable diseases.

The great value of walking in maintaining health and promoting longevity is generally acknowledged, but the exercise of the arms, left as well as right, is not sufficiently attended to, although it is most important.

Breathing exercises are likewise but imperfectly appreciated, and yet their influence on the prevention of disease, on the maintenance of the vigors of the organs of circulation and respiration, is most beneficial. These exercises ought to be practised not only in the house but the habit of deep inspiration and expiration ought also to be practised on the daily walks in the open air, the increased inhaling of which is an additional advantage.

A somewhat uncertain point is sleep. Some persons of great intelligence assert that they require eight hours, as you say of Mr. Frederic Harrison, while Lord Strathcona "makes a point of not sleeping longer than six hours a day." From very numerous observations I infer that for most adult persons six hours is quite enough. As to myself, I have during the thirty most active years of my life never been more than six hours in bed, and have rarely had more than five hours of much interrupted sleep. After the age of 60 I have given up evening correspondence and substituted for it the study of Greek coins, and this has much improved my sleep.

Your leading article closes with the famous words of the *Regimen Sanitatis* of Salerno. Let me close with the words which Shakespeare puts into the mouth of Old Adam:

> Though I look old, yet I am strong and lusty,
> For in my youth I never did apply
> Hot and rebellious spirits in my blood,
> Nor did not with unbashful forehead woo
> The means of weakness and debility;
> Therefore my age is like a misty winter—
> Frosty but kindly.
>
> *As You Like It*, Act II, Scene 3.

—I am, etc.,

London, W., Oct. 29th. HERMANN WEBER.

THE SURGICAL TREATMENT OF RECTAL CANCER.

SIR,—I have read with much interest Mr. Harrison Cripps's paper on this subject in the BRITISH MEDICAL JOURNAL, October 5th, 1912, and while I am quite in agreement with many of his statements with regard to this very important subject, and fully realize the valuable pathological work which Mr. Cripps is doing and has done in the past in the elucidation of this disease, he makes certain statements in his paper which cannot be allowed to pass unchallenged.

He says: "As regards the sigmoidoscope, it is worse than useless, being at times positively misleading. Cancer can never be diagnosed to a certainty by sight alone; touch only by indicating hardness and friability has to be relied upon." Such a statement as this in these days is really astonishing. While no one will deny the value of the expert finger in diagnosing rectal cancer, Mr. Cripps would apparently condemn all cases of cancer high up in the rectum, which it is impossible to reach with the finger, to go undiagnosed. The enormous improvement in the treatment of cancer of the rectum which has lately taken place is due largely to the fact that diagnosis is now much more exact, and is made much earlier owing to the use of the sigmoidoscope, and it would indeed be putting back the clock to cease using this instrument in diagnosis. So far is Mr. Cripps's statement from the truth that diagnosis by means of the sigmoidoscope is the most exact method of diagnosis for rectal cancer that we have ever had. Cancer can be more certainly diagnosed by sight than by touch; and, quite apart from this, my own practice, and, I believe, that of other surgeons, on detecting a growth high up in the bowel by means of the sigmoidoscope, is at the time to remove a small portion of the growth and send it to an expert pathologist for examination. Surely this is a far more certain method of diagnosis than the mere feeling of a lump in the bowel by even such an experienced examiner as Mr. Harrison Cripps! The use of the sigmoidoscope has enabled us to diagnose cases at a much earlier stage than was hitherto possible, and with much greater certainty than was the case when palpation was the only method for arriving at the truth.

Another statement of Mr. Cripps, I think, requires correction. He says: "An overwhelming percentage of cases" (that is, of rectal cancer) "are situated within 6 in. of the anus, and therefore can be dealt with from below, probably not 10 per cent. originating above this height." This is certainly not the case. From my own experience, founded upon the cases at St. Mark's Hospital

during a number of years and from a fairly extensive private practice, I should say that the commonest situation for cancer of the rectum is the recto-sigmoidal junction, above the peritoneal reflection and out of reach of the finger. Such cases must, of course, pass undiagnosed by Mr. Cripps, as he has no means of arriving at a diagnosis when the growth is in this situation. But since the use of the sigmoidoscope has enabled us to detect growths high up in the bowel just as easily as those in the lower part of the bowel, it has been found that the growths in the former situation appear to predominate. My own figures show a percentage as follows:

Above the peritoneal reflection	...	63 per cent.
Below " "	...	37 "

Dr. Tuttle's figures on the same point from the last edition of his book are:

Above the peritoneal reflection	...	72 per cent.
Below " "	...	28 "

These figures do not include growths in the sigmoid flexure.

These figures speak for themselves, and had Mr. Harrison Cripps been in the habit of using the sigmoidoscope for diagnosis I am sure he would long ago have discoved the fallacy of the figures he quotes.—I am, etc.,

London, W., Oct. 28th. P. LOCKHART MUMMERY.

SIR,—Mr. Harrison Cripps, in his interesting address on the "Surgical Treatment of Rectal Cancer"[1] condemns the use of the sigmoidoscope in the diagnosis of rectal cancer, and states that it is "worse than useless."

An opinion such as this, expressed by a leading rectal surgeon in opening a discussion on rectal carcinoma, will tend to discredit the diagnostic value of the sigmoidoscope in the eyes of the general practitioner, and, if the statement goes unchallenged, to lend colour to an assumption that this opinion is shared by other rectal surgeons. I venture to think that no such view is held by any of my colleagues at St. Mark's Hospital, or by those who make constant use of the sigmoidoscope in out-patient departments.

Though the sigmoidoscope takes no part in the diagnosis of low-lying rectal carcinomata which are within reach of the finger, it is of the greatest value in the diagnosis of early carcinoma high up in the rectum or low down in the pelvic colon. It enables a diagnosis to be made with certainty, which can be made in one other way only, and that by exploratory operation. When used constantly in the out-patient room, as at St. Mark's, it is often the means of discovering a carcinoma which is wholly unsuspected. Were it necessary, in support of my contention, I could produce a number of cases in which a diagnosis of early carcinoma has been made by the sigmoidoscope and followed by successful removal of the tumour, when no such diagnosis could have been made by digital examination.

During the discussion which followed Mr. Cripps's paper only one speaker commented on Mr. Cripps's reference to the sigmoidoscope to dissent from it, and for this reason I venture to protest against the discouragement of a valuable aid to the early recognition of high rectal cancer by one speaking *ex cathedra*.—I am, etc.,

London, W., Oct. 29th. C. GORDON WATSON.

RASHES OCCURRING DURING THE PUERPERIUM.

SIR,—Will you allow me to comment on the paper of Sir John Byers on this subject? His conclusion (4 *b*) that—

> From a person ill of scarlatina there may be conveyed to a lying-in woman septicaemia, arising from the secondary septic changes which are apt to take place in the throat, etc., in scarlatina,

appears to me to have been absolutely disproved in the great papers by Dr. Boxall, to which Sir John Byers refers, but which do not seem to have influenced his judgement as I think they should have done; and it is implicitly negatived by a sentence in his next paragraph, that—

> The latter (*a*) should be avoided by modern aseptic and antiseptic precautions.

Boxall showed that when scarlet fever was present in the wards of the General Lying-in Hospital, the morbidity among the patients who did not get scarlet fever was not in the least raised; and Sir John Byers says that septicaemia, in a puerperal woman who has been exposed to scarlatinal infection, is to be prevented by "aseptic and antiseptic precautions." In other words, it is the fault of a careless doctor or nurse, and not of the scarlatina.—I am, etc.,

London, W., Oct. 26th. G. E. HERMAN.

THE WASTE OF MEDICAL EXPERIENCE.

SIR,—The note in the JOURNAL of October 26th under this heading should be carefully read and digested by every practitioner. I read it with great interest, and while doing so my thoughts at once reverted to a letter by Dr. J. Dewar in the JOURNAL of November 17th, 1900, p. 1473, bearing on the same subject. In the course of this letter he says:

> A country practitioner told me three or four years ago what I did not know, and which no consultant and no one else whom I have come across knows—namely, that calomel, when placed on the tongue in doses of one-sixth of a grain, and repeated every half-hour for twelve or eighteen hours, always aborts a quinsy. Since then I have always adopted this simple treatment, and have never found it fail.

I was at the time much struck with this statement, and determined myself to adopt this treatment, which I too have never found to fail if given early and in the free suppuration stage. Some years ago I read notes of 5 cases treated by this method, at our local medical society meeting. Unfortunately I cannot now find my notes, but there was one very interesting point I had noticed, and to which I draw attention. In three of the cases I commenced treatment before there was any apparent sign of suppuration. The quinsy was aborted within eighteen hours, and there was no purging of the patient.

In the other two cases there was evidence that suppuration had commenced within the tonsil. In these two cases the treatment was not only of no avail but strongly purged the patient.

Why, in the one case, calomel should cure and not purge and in the other case purge and fail to cure is a conundrum I leave to the expert to explain, but I cannot help reiterating the complaint of Dr. Dewar that enough is not done to obtain from the general practitioner throughout the country the results of unexplained observations. The old country doctor is as a rule rather timid and averse to relating before his local medical society observations which he cannot explain, for fear of being laughed at by the young doctor and for fear of being considered unorthodox. Surely there ought to be some way of gathering in the life experience of these men instead of allowing their valuable observations to die with them.—I am, etc.,

Torquay, Oct. 28th. G. YOUNG EALES.

"THE DOCTOR AND HIS WORK."

SIR,—In your leading article of October 12th under the above title, in the course of your kind review of my book, you very naturally call attention to the close resemblance of its designation to that of a previous work by Mr. Brudenell Carter. I feel that I owe an explanation to that gentleman, and I trust, therefore, that you will allow me to say that until I read your article I was not aware of the existence of his book, *Doctors and their Work*. For this oversight I tender him my apology.—I am, etc.,

Bath, Oct. 28th. CHARLES J. WHITBY.

FLANNELETTE: A DISCLAIMER.

SIR,—In the *Daily Express* of to-day's date, a full-page advertisement of "Non Flam" appears in which a quotation from evidence given by me before the Departmental Committee appointed to inquire into the law relating to coroners' inquests, etc., is given as follows: "Dr. Parry of the Children's Hospital, Brighton, in giving evidence before the Home Office Committee, says: 'Practically every death or serious accident from burning is from a flannelette garment.'" This is placed close under the following words: "Non Flam. The only safety flannelette Fabric that is *really* safe!" I have two complaints to make against the Non Flam firm. The first is that my name is used by them without my permission. Perhaps as it is a quotation from a public document I have not much right to object to this. My second complaint is

[1] BRITISH MEDICAL JOURNAL, October 5th, p. 843.

more serious. The evidence I gave before the Committee was to show that it was impossible to substantiate the claims of Non Flam as a fireproof material, and that after a few washings in the ordinary way the fabric burnt readily. (I burnt some specimens of washed Non Flam before the members of the Committee, and showed how easily it flamed.) It is under these circumstances that I desire to protest against the use of my name.—I am, etc.,

Hove, Oct. 28th. L. A. PARRY.

Medico-Legal.

STEVENS v. BRITISH MEDICAL ASSOCIATION.

WHEN the court resumed on Thursday, October 24th, Dr. Campbell was cross-examined by Mr. Gregory. He said that he had been in practice since 1864, and had treated a number of patients suffering from tuberculosis. He had used various remedies, and had had a fair amount of success. He had used cod-liver oil and hypophosphite of lime, and some of his patients had got better. That treatment, however, was abandoned. Some of the cases so treated appeared to get better. He had also treated with a view to improving the general health. Under Mr. Stevens's treatment the improvement was more rapid. When dealing with consumption the prognosis was uncertain. Recovery was sometimes a surprise to the doctor. Arsenic was a specific in neuralgia. He called anything a specific which was a success. He gave Mr. Stevens's mixture to from 15 to 20 persons since 1906. Since December, 1907, he had treated 30 persons for tuberculosis; none of them had died. All the persons he had treated were cured—that is to say, they had got rid of the cough and were able to resume work. During the five years prior to 1907 he had treated 50 to 60 persons, and had cured them all.

Mr. Gregory: Then you have discovered a cure?—I do not regard the disease as fatal in every case. I was in a favourable climate. I attribute cure more to climate and surroundings than the actual drug.

Continuing, witness said that he would recommend that the medicine be used under medical advice.

Mr. Gregory: Assume that a man was living in a crowded city, would he have much chance?—No. If living in unfavourable circumstances, this medicine would not be likely to cure him.

Continuing, he said that to advertise this physic for any one to buy, and to say that any one so buying and taking it would be cured, was going too far. There were different stages and forms of the disease; in some forms and stages there was no hope of recovery. Where, for instance, there were cavities and the lungs had broken down this physic was of no avail. These were the persons who would be the first to grasp at any offer to cure.

In re-examination, witness said that if treated with cod-liver oil the three cases he had mentioned might have been cured. Cod-liver oil was not a germicide.

Mr. Justice Pickford: Did you go on using this substance until you retired from practice? No, I exhausted my stock. I did not advise patients to buy it, because I found they got on well under my own treatment.

Continuing, witness said, in answer to Mr. Tindal Atkinson, that in one of his cases there was a cavity, and that patient was cured.

Mr. Day, a clerk in the employment of the Great Northern Railway, having given evidence,

Mr. John William Sames, M.R.C.S., L.R.C.P., practising at Acton, said that in August, 1910, he attended the last witness, who was suffering from tuberculosis of the abdominal wall and of the left testicle. When he came under his care he had not much hope of him. He was very emaciated and was gradually fading away. On August 19th he heard of Stevens's remedy. Mr. Stevens then sent him a sample bottle with the analysis. He used the sample bottle after having shown the analysis to his patient. The effect on the patient was that his appetite improved. He kept on administering it. Mr. Stevens came to see him later on, and the patient gradually got better. He improved for six weeks, at the end of which he was able to walk about. He administered injections from time to time. Witness attended him from the middle of June until September, 1911. The patient went back to work in April, 1912. In his view the man had made a recovery, although when he first came to him witness thought he was going to die. In his view the medicine had curative properties. He was not anxious to give evidence.

In cross-examination by Mr. Colam, witness said that the tuberculous abscess from which the patient was suffering produced great weakness and great depression. He could not specify the average time of a cure from tuberculous abscess. If the abscess was either naturally or artificially opened the patient might begin to recover slowly. The discharge from the abscess began before Mr. Day came under his treatment. The analysis impressed him because the medicine was described as being destructive to the tubercle bacillus. This must also have impressed the patient. That was what gave him confidence to try it.

Mr. Colam: Carbolic acid would kill a germ?—Yes, but it is an irritant.

The mere fact that a substance kills a germ proves nothing?—I think it does.

A hundred different things would kill germs?—Yes.

Continuing, witness said that although a substance would kill a germ in the test tube, it did not follow that it would kill germs in the body. There were lots of things that would improve the appetite. Moreover, it would be a great point gained to impress the patient with the fact that you had got a specific. His appetite returning and the abscess discharging, he might, having hope given him, have recovered although the medicine had no curative effect. The man had not been under his care since September, 1911.

In re-examination witness said that, as far as he could recollect, the abscess began to discharge three months after the treatment commenced. It was his opinion that the patient could not have recovered without Mr. Stevens's medicine. Hope was one of the distinguishing characteristics of tuberculous patients. They had intervals of despair. This was not, in his view, a case of cure by suggestion. The discharge from the abscess ceased to be so purulent after the treatment.

Miss Marian Olley, living at Sangley Road, Catford, a typewriter, said that she had been cured of consumption after taking Mr. Stevens's remedy for eighteen months, and that in December, 1911, Dr. Mitchell Bruce gave a certificate to that effect. She had gone to see him as an eminent member of the profession at the suggestion of Mr. Stevens. The certificate stated that the condition of the patient was such that the lungs were healed, and that she might resume her place in society. There was no reason why it should recur in healthy surroundings.

The Rev. G. Hall said that when in the West Indies in July, 1905, he had sudden haemorrhage from the lungs. He was brought home, and he saw Dr. Maguire in Seymour Street. He treated witness with a series of injections of haemasaxin daily for six week. The treatment did him good, and after six months he was able to undertake light work. In August, 1906, he was able to do light duty at Bexhill, where he stayed for eighteen months. In the winter of 1907 the haemorrhage suddenly commenced again, and lasted nearly two months. He was in bed for five months. He had given himself up as hopeless, but then went to Bournemouth, and was treated by a doctor at Bexhill. He began to take Mr. Stevens's medicine in 1908, having heard of it through a clerk in Mr. Stevens's office. He used it regularly for a year. It had a gradual effect until in November, 1909, when he was certified by Dr. Maguire to be free from disease. He was then presented with the living he now held. He had never been away from work for a single day since that date.

In cross-examination, Mr. Hall said that he had suffered much from malaria in the West Indies. He finished with Dr. Maguire's treatment at the end of six weeks. He only took Mr. Stevens's remedy internally. It was then put up in the same form as that in which it was now supplied to him. He took it when he had a cough.

Mr. Hudson Evans, M.R.C.S., L.R.C.P., practising at Lewisham, said that he began using Mr. Stevens's remedy in January, 1912. In March he commenced treating a girl suffering from hip disease with the medicine. Her condition had greatly improved, but he could not say to what the improvement was due. There was no known drug which had any effect on disease of the hip. In another case a patient developed tuberculous glands at the side of the neck. She was operated on. Six months ago she developed a tuberculous swelling under the right knee. He was of opinion that in this case Mr. Stevens's extract did good. He had treated 25 pulmonary cases during the present year. The witness proceeded to give particulars of these cases. J. H. B., a baker, living under unhealthy conditions, developed phthisis in May. Witness sent him to Brighton, where he stayed for some time. Two days ago an examination failed to disclose any trace of the disease. F. E. C., aged 23, five years ago had phthisis. He was sent to Eversfield Hospital. He came back and joined the Territorials. In March, 1912, he again broke down and went back to hospital. His condition now varied. W. H. K. had tubercle of the left lung seven years ago, from which he recovered. It subsequently returned, but there was now a complete absence of tubercle bacilli. He had been treated with Mr. Stevens's extract. A. H., aged 26, had pleurisy in August, 1911. In October, 1911 she had a bad cold, after which she had patches of what appeared to be tuberculosis about the lung. Under the treatment her condition seemed to vary. He could not promise any early recovery. A. G. was a young man who had an attack of influenza. It subsequently appeared that he had tuberculosis. He was sent to Herne Bay. T. G., a small tradesman, who undoubtedly had tubercle, was taken ill in June. He was now at Herne Bay, and had written to say he was getting on all right. Witness was a member of the British Medical Association, and it was no pleasure for him to give evidence against them. He had never tried krameria in lung trouble. In 9 out of 25 cases treated since January, 1912, he found no trace of disease.

Cross-examined by Mr. Colam: Of the 9 cases in which there was now no trace of tubercle, 6 undoubtedly had tubercle to begin with. In some of his cases, as he had already said, there was a doubt as to whether there was tuberculosis. He would not like to say there was an absolute cure in any case until four or five years had elapsed. He always administered Mr. Stevens's medicine by the mouth. Although a tuberculous abscess was destroyed, that did not destroy the disease. Sometimes consumption cases took a miraculous turn. He had not found out anything which would cause the bacilli to be attacked by this medicine. In nearly every case he had sent his patients

to the country, but he never sent a patient away to the country until, by the treatment, he had arrested the disease.

Re-examined, witness said that all drugs had come into use as the result of experiment. Quinine and quassia had thus come into use. One ought not to dogmatize on 25 cases, but so far as he has gone he was encouraged to continue the treatment. He had tried guaiacol in 2 cases.

Mr. Williams having given evidence,

Mr. Archibald Stewart, chief clerk to Messrs. Dyer and Dyer, South African merchants, said that he was in charge of the import department. He had to send each year to Mr. Stevens two to four sacks, described as bags of roots. This started in 1908, and they had been coming fairly regularly ever since. They commenced to arrive in June, 1908, and the last parcel came in September, 1912. He could not say how much the bag held.

Dr. F. A. de Boissiere, practising in Camden Town, said he had treated two cases with Mr. Stevens's medicine, and found it effective.

In cross-examination, he said he had not found tubercle bacilli, and had not examined for them. In one case the effect of the medicine appeared to be that the patient was able to keep her food down.

Dr. Thomas Muirhead Martin said he was practising in the North-East of London. When he was in practice in the North of England he suffered from bronchial trouble. So bad was he that he sold his practice and came south. In June, 1911, he began using Stevens's remedy. The effect of the drug appeared to be that it stopped the cough and seemed to clear up the lung. It appeared to him to have some medicinal properties. He had not tried it on patients, but had tried it on his children. He was a member of the British Medical Association.

In cross-examination he said that while he had all the symptoms of tuberculosis, he had never examined his sputum.

Mr. Colam: Have you had tuberculosis or have you not?—Not quite.

Dr. Souttar, practising at Wimbledon, said that when he first read the analysis of Stevens's remedy he thought that Stevens was a fraud. A few months ago he had a case under his care which he thought was hopeless. He subsequently met Mr. Stevens and began to use his remedy, and had found it efficacious.

The hearing was adjourned.

Miss Elisia Bohm said that in 1899 she was suffering from her chest and pleurisy. In the spring of 1903 she was ill again, and in March, 1904, she went to see the plaintiff at Capetown. He gave her a bottle of herbs which she used. She told Mr. Stevens that she was suffering from——

Mr. Holman Gregory: I object to her telling us what she told Mr. Stevens. It is hearsay.

Mr. Justice Pickford: This is a question of bonâ fides. What she told Mr. Stevens is evidence to show that he believed he had effected a cure.

Continuing, witness said that Mr. Stevens charged her nothing for the remedy.

Cross-examined, witness said she went to South Africa as a last resort, and that she nearly died on the way out. She got gradually worse there.

Mr. Gregory: Were you very ill on board ship?—Yes, with my cough. The doctor on board gave me a remedy for my cough which did me no good.

Continuing, witness said she did not improve for a long time in South Africa and her voice went. She lived in the open the whole of the time. Mr. Stevens saw her in his office at Capetown. She did not hear the word "Sacco," but he was not selling it to her knowledge. The remedy she had was described as a herb and she took it in an infusion. It caused much expectoration, and after three weeks of taking the herb she was entirely different and she was able to sleep.

Re-examined, she said that she had never had pleurisy since.

Captain James Bailey, formerly of the Cape Mounted Police, said he saw a report of this case in the paper and communicated with the plaintiff's solicitor. He had heard of a root used by natives in South Africa for cases of affection of the chest and lung trouble. The root was *mu'klobo*, that would be the nearest phonetic spelling. He recognized the word in the reports of this case. He had never heard of Mr. Stevens before.

Cross-examined by Mr. Holman Gregory, witness said that this substance was used with other herbs. It was used for superficial wounds. From what he had seen, it had astringent properties. He had seen the plant. It was a tuber, something like a small Spanish onion when fresh. The natives dried it, mashed it between stones, and then macerated it in water. For external use they used it green. It had a powerful styptic, possibly an antiseptic, use.

In answer to Mr. Justice Pickford, witness said the natives used it constantly.

Re-examined, witness said he could not give the English meaning of the term. The dried powder produced was very like it.

Mr. Gregory: But that is a long root cut up into pieces?—That looks to me like the centre of an elongated tuber. I have usually seen it as a green root, about the size of a small carrot—an inch and a half in diameter.

Mr. Charles Henry Stevens, the plaintiff, said he resided at 204, Worple Road, Wimbledon. He was born at Birmingham in 1880. In 1897 he lost a stone and a half in weight in six weeks, and he then consulted a doctor in Birmingham, who said it was lung trouble. He subsequently consulted a specialist, who said he was suffering from tuberculosis. He was advised to go to South Africa. He went straight to Bloemfontein, and shortly after his arrival he had some conversation with a Dutchman from Maseru, on the borders of Basutoland. This man told him of a native cure for consumption which had cured an Englishman a few years before. Eventually he went to Maseru, and two days later the native who had the remedy came to see him. His name was Kagaitse. The medicine was awful-looking stuff; he had taken it out of the ground and crushed it between two stones. He told plaintiff to boil it and take the tea of it night and morning. The first week he thought it would kill him; it seemed to be too strong, and made him vomit for two hours every morning. After two months he was well except for slight expectoration. He continued it for more than two months. He had taken it ever since. The cough left him entirely after two or three months. He left Capetown early in January. Before leaving the district he obtained a supply of the stuff from the native. He was in Africa from October, 1897, to January, 1898. He visited a doctor in Birmingham on his return, who said that the trouble had quite cleared up, the only trace being a little dullness at the apex of the left lung. Although he lost weight during the first week he put on weight afterwards. He gave the remedy to many persons in England, and it seemed to have beneficial results in every case. He was accepted as a volunteer on the outbreak of the South African war. The same doctor in Birmingham examined him. He (the doctor) put his recovery down to the climate, and laughed at the remedy. When he first saw the native he referred to it as a melisen root—meaning, probably, medicine. He did not hear of umckaloabo until 1905, and then from a native who was collecting roots for him. After serving in the Capetown Police, he started a cycle business, and had a fire. He was uninsured. He then returned to Maseru and got some more of the root from the native who first attended him. He afterwards collected a stock of it, having found out many localities in which it grew, and made arrangements for supplies to be sent to him. He saw Dr. Anderson, medical officer of health at Capetown, and showed him fifty testimonials. Dr. Anderson said it did not interest him. Dr. Gregory, medical officer of health for Cape Colony, also refused to have anything to do with it. Having failed to interest the medical profession, he advertised it as "Sacco," and carried on the business of selling it, the results being, so far as he could ascertain, very satisfactory. Later on he turned the business into a limited company called Sacco, Limited. He did not attempt to get money shares. Even the directors were given their shares. The directors evidently wanted to help themselves very freely.

Mr. Justice Pickford: Do you mean they wanted to take too large a share of the profits?—Yes, and I left the company practically without compensation.

Continuing, witness said he then went to Johannesburg and started a company called Lungsava. It was there that he first started to mix chijitse with umckaloabo. The herb chijitse had great healing properties; applied to a cut finger it would stop bleeding. The compound he now sold still contained umckaloabo, but it was now prepared in a different way. He only used the kernels of the root and extracted the fibrous matter. When *Secret Remedies* was published he was doing a very large business. He had sent circulars to thousands of medical practitioners and had received thousands of letters from them, though often with requests not to publish their names. Counsel then referred to the article which had appeared in *Truth*, and then read a number of anonymous testimonials which the plaintiff had received from various parts of the country. Continuing, witness said that subsequent to this article *Truth* commenced putting his advertisements in that paper. Since 1906 he had received a number of letters from doctors. In his transactions with persons using his remedy he had used two forms of guarantee, but now the guarantee was not printed. It was contained in a letter, and he guaranteed that health would improve within three months to the satisfaction of the patient or his doctor, otherwise the money would be returned. About £60 out of £4,500 was returned in sums of £2 12s. 6d. A Mr. Langford took three months' treatment. Witness never saw him personally. He got "silica on the lung," and his complaint had nothing to do with tuberculosis. He was very satisfied at first, and paid for the first course of treatment. The witness naturally did not return the money. He eventually died, but witness did not know the cause of his death.

Mr. Tindal Atkinson: Do you use any krameria in your mixture?—No; I never knew of it until this case was commenced, and I never bought an ounce of it. Continuing, witness said the first attack made upon him was in the BRITISH MEDICAL JOURNAL on August 22nd, 1908, at pp. 506, 518. It was headed, "Stevens's Consumption Cures." That had no immediate effect on his business, except that many doctors who had been using his medicine stopped using it. But after the publication of *Secret Remedies* he soon noticed a reduction in his receipts. They dropped from £4,400 in the first year to £2,900 in the second year. He also got numerous postcards from persons calling him a quack and giving him other abuse. He would have been ashamed of himself if there had been any truth in the statements. On August 28th, 1908, he wrote a violent letter with reference to their article, saying he would have been only too willing to give them opportunities of testing his discovery. On October 30th, 1908, the General Secretary of the Association wrote to him to say that the Association proposed to take no action with regard to his letter. He had during the whole of his time tried to get the medical profession to accept his remedy. He even offered to the Brompton Hospital to be inoculated with the disease and then cure himself.

Cross-examined by Mr. Gregory: He knew fifteen years ago that cure for consumption depended largely on climate. He had treated thousands of persons for consumption. He went to South Africa for the first time when he was ill in October, 1897. He came home in January, 1898. He went to South Africa in February, 1902, to join the Cape Mounted Police. He was with that force until March, 1903, when he formed the New Hudson Agency, a cycle business in Capetown, which he ran until about May, 1904. At Capetown he started the Sacco business, and remained there until May, 1906, when he went to Johannesburg, where he sold Lungsava, and remained there for about fourteen months, until July, 1907. There he got supplies of herbs to bring over with him, and after two months he came to England, and had remained ever since.

Mr. Justice Pickford: When you left the Sacco business in Capetown, did the company continue to carry on business?—Only for a short time.

Continuing, witness said he was sent to South Africa as his last chance. He kept in the fresh air on the way out.

Mr. Gregory: Have you ever told this story, that you were taken to see this Kaffir by a Dutchman, before this case?—Yes; but it was not published. I told it to a representative of the *Transvaal Leader*.

Continuing, he said he had been warned by a cablegram that the article had appeared in *Truth*. He had never told his London representative of the history of the finding of the drug. He never told his friends that he had had tuberculosis, because they would always treat him like a leper. They would not believe he was cured. It was a mistake to say, as had been said in the article in *Truth*, that he was in the Cape Police at the time he made the discovery of the drug. The mistake was only a slight one. Mr. Whiteman knew he had been in the Cape Police, but did not know for how long. He did not tell the story about the finding of the drug in the Bramley action.

Mr. Gregory: Did you ever study under a doctor?—I studied with doctors, but have not studied under a doctor in the modern sense.

Did you say to *Truth*, "I first got the cure which I discovered by accident"?—Yes, and so I did. It was an accident that I met the native.

Did you say that this native was curing natives of consumption?—No. A cure of natives has never been mentioned.

Continuing, witness said he began using the "cure" in 1898. He did not then call it by any particular name; he did not name it until 1904, when he put "Sacco" on the bottle. He never gave the name of the root until he came to London. The native whom he saw in 1897 was 60 or 70 years of age. It was the same man that he saw in 1904. He corresponded with him between 1897 and 1904 as to getting more stuff. The native could read and write English, but witness had none of the native's letters with him. The native sent him roots from time to time by post.

Mr. Gregory: He must have been an intelligent native! Where did he live?—In a mud and stick hut. I paid him in South African bank notes.

Continuing, witness said that the plant varied in height. The leaf was nearly triangular, but near the stem there were little bulbs on either side. Leaves would sometimes spring up from the root. Some of the leaves sprung from the stalk, some from the root. He could not recollect having seen it in blossom. The root varied according to the ground. It was either 8 in. long or else more stumpy, like a carrot. A young root was almost white. The bark of the old roots was black.

Mr. Gregory: Through whom do you get the root?—Natives collect it.

From whom do you purchase it?—Must I say?

Mr. Justice Pickford: If you object to mention the name write it down.—I do not exactly purchase it.

Write down the name of the person with whom you communicate when you want a further supply.—I am getting all I can get.

Mr. Justice Pickford: Who writes to you to say that he is forwarding you some more?—[The name was written down and handed to the learned counsel.]

Do you never write to any one to ask for more?—He knows I am always wanting it.

Mr. Gregory: Do you send him money for it?—Yes.

Have you any entries in your books with regard to it?—Yes, but the books only show part of the payment. I generally send the money by postal order, but do not keep the counterfoils. If the company sends money there is no entry in the books as to its being sent.

Continuing, he did not keep copies of the letters sent to the man in South Africa. It was a private matter.

Mr. Justice Pickford: We shall sometime have information as to what the company consists of.

Continuing, witness said he was not an original shareholder, but he now had one share. He accounted to the other shareholder, and there was an auditor who audited the books each year. When the company was formed he sold the business to it. He also sold them the recipe. He never let any one know where he got the remedy, but certain documents were sealed up in a certain place, so that should anything happen to him the business could still go on. Sacco consisted of umckaloabo as it came from the ground. It was the root just as it was, with no addition. He advertised Sacco freely in South Africa as an "absolute cure in all cases of consumption." The business flourished, and in a short time he was making a net profit of £3,000 a year.

Mr. Gregory: Why did you leave Capetown in such flourishing circumstances?—It is a very long story. Unfortunately there was litigation. A man commenced to blackmail me for £30, and that used up all my spare cash.

Continuing, when he started selling Sacco the business rapidly grew. The sales of Sacco did not begin to die away until the litigation in which witness was mixed up took place. That affected his personal reputation, and the business declined. It was not worth while staying at Capetown, so he came home. He put a document into the bank, describing to some extent what Sacco was; but the document would not have been complete without the assistance of the man who got the root for him. At that time there was more than one man collecting.

Mr. Gregory: What became of the recipe?—I do not know what became of it. The company continued in business and went into liquidation in July, 1906.

Continuing, witness said that the company had £1,200 to £1,300 worth of crude herb powder in stock. That was umckaloabo. He did not know what the action of the drug was. He had mentioned it in one of his circulars as a vegetable germicide. It was his belief then that it entered the blood and killed the bacilli, but he could not be quite sure. That it did cure consumption he had no doubt.

Mr. Justice Pickford: Did you leave instructions with the Sacco Company so that they could manufacture this substance?—Yes, they could have done so with the assistance of the man, but he refused to have anything to do with them.

Continuing, witness said he may have covenanted with them not to compete with the company, but he was absolved from that covenant by a resolution. He set up in Johannesburg as "The South African Institute of Medicine." That was for the cure of consumption and miner's phthisis. That was cured by umckaloabo and another plant, of which he did not know the name. He sold Lungsava, which contained umckaloabo and chijitse, and this plant which he did not know. There was one Lungsava for phthisis and one for silicosis. The reason he gave up selling it in Johannesburg was because he sold the business.

Mr. Gregory: Were you convicted of any offence there?—Yes, for doing that which specially belonged to the medical practitioner. I was fined £10 in the first place. On appeal the appeal was dismissed, but one judge was in my favour.

Was that the only time you were convicted?—No. I was convicted again later. Conviction did not prevent me trying to save people's lives.

How long after?—About six months. He was then fined £25 on each of two counts for advising miners to use Lungsava, but in his view the fines were heavy, because he had done good in two cases.

Mr. Justice Pickford: Why should the magistrate fine you more because you did good?—He was vindictive. I proved that I had done good.

Continuing, he said that before the conviction he had sold his business to D. Rose. Miners' lungs were full of dust. He could not suggest how the remedy worked; he knew it did work. Because a thing was a germicide it did not mean that it had no other effect. He did not give D. Rose the prescription of Lungsava, or tell him where he could obtain the root. He simply sold the business. He was to have the physic if he bought his ingredients from the witness. About that time he tried to promote a company to sell Lungsava in England. The company was never brought out. Everybody at that time in Johannesburg was hard up, and it was not a success. [The prospectus was produced.] He had heard of chijitse some two years before. It was a herb in common use among the Kaffirs. He had looked into the South African *Materia Medica*. He did not find it described in that book at all. He did not go to any botanist or other person to ascertain what the herb was. The name he got from a Kaffir who collected roots for him. He saw a native heal a cut with it in less time than it took to tell it. He tried it on himself.

Mr. Gregory: But you were healed at that time. What good did it do?—It made my chest feel more comfortable. I say it is soothing to the throat and chest.

How does medicine administered internally affect the lungs?—I do not know.

Had you found that umckaloabo was efficacious to stop bleeding from the lungs?—Yes, but with the other remedy added it was more efficacious.

Continuing, witness said he saw what was put in *Truth*. He was quite sure that if he had continued advertising in *Truth* the attacks would not have appeared. He thought he was justified in publishing extracts from articles in *Truth* when Mr. Labouchere did the same. Mr. Labouchere had published advertisements announcing it was an absolute cure, but he had no copies in court (a copy was subsequently produced). He arrived in England about the beginning of December, 1907; he had somewhere about £1,000. He started selling his remedy a few days after he arrived, and began advertising in the *News of the World* and other Sunday papers. He did not advertise in any daily papers at that time. When people wrote to him as to his advertisements he replied to them. Sometimes he had duplicated forms of letters in which to reply to them. He got sometimes 100 or more answers in a week. The highest figure he paid in advertisements in the Sunday papers in any one year was £600 or £700.

Mr. Gregory: Had you any fixed price for the medicine?—In 1908, I had; usually £2 12s. 6d. for a three months' course.

Did it vary?—If the patient was too poor to pay, he paid nothing; sometimes half. Sometimes I charged more—as much as five or six times more—when the patient had more medicine; and I judged of the amount by the reports sent me by the patients.

Continuing, witness said he sold it to approximately 1,000 persons in the last year, seeing 4 or 5 in 100 personally. In reply to the advertisements he would get an answer in detail. In one of his advertisements he was described as having gone through "unexplored country" and "as having spent thousands of pounds."

Mr. Gregory: Is that true?—It was drawn by an advertising agent, and it is exaggerated. I did not read it carefully, but I suppose I must take responsibility for it.

You wrote: I only returned to England to prove my cure to the satisfaction of the British Government?—That was the principal reason. I hoped to convince the medical profession, and through them the British Government.

Mr. Justice Pickford: How did you hope to convince the Government?—Through the medical profession.

Mr. Gregory: Did you write to patients, "Should my treatment make you sick for the first few days, it is a sign that you are undoubtedly consumptive"?—Yes; I did not draw that up, but there is a great deal of truth in it. That circular went out for a very short time.

Continuing, witness said that if a consumptive had expectoration amounting to 2 oz. a day, the medicine would first increase it and then it would diminish. He would not undertake to cure a man whose system had been so weakened by the disease that he was dying. He had, however, cured a man whose lung was the size of two five-shilling pieces.

Mr. Gregory: What must be the condition of a man's lungs in order to enable you to cure him?—It depends on many things besides the lungs.

Mr. Gregory: Show me any one advertisement in a newspaper where you qualify the statement that you can give an absolute cure?—I will look for them. The whole thing seems to depend on the meaning of the word "cure."

What do you mean by the "cure"?—I attach the same meaning as the medical men give to the antitoxin in diphtheria. If given in time it is a cure.

Mr. Justice Pickford: Do you think that is the meaning the ordinary reader would attach to it?—Yes; the ordinary reader would not apply it to a case which had only two or three days to live.

Mr. Gregory was proceeding to read articles in *Truth*.

Mr. Tindal Atkinson: I do not know how these are relevant. There is an action pending against *Truth*.

Mr. Gregory: I merely wanted to refer to the articles in *Truth* where a protest was made against publication of parts of the articles which appeared in that journal.

Continuing, witness said he did not consider that it was fair to set out only extracts. He published the whole article in South Africa. His agent had improperly published abstracts here.

A paragraph about the witness appeared from year to year in *Truth's* cautionary list. One reason why he left Capetown was that he was an undischarged bankrupt. That was not the sole reason. He was made bankrupt for about £1,500, but he had paid everything except £500, which he did not owe and never would pay. He was prosecuted for perjury at Capetown, but was acquitted. As a result he had a number of actions brought against him, which were expensive. There was not a debt which he admitted owing when he left South Africa. In the early part of 1908 the composition of his cure was exactly the same as it was to-day. The injection which he used consisted of umckaloabo dissolved in water. He had also been experimenting with another solution which he only used on one patient very far advanced.

Have you been obtaining tuberculin, either directly or indirectly?—No; I would not give it to a dog of mine.

The court adjourned at this point.

On the resumption of the case on Monday, October 28th, the cross-examination of the plaintiff was continued.

Witness said he had treated a man named Langford, a South African miner, who had been told that the fee for a three months' course was £7. He had offered to pay £14 if cured, and for the carriage of medicine in case of failure. As to whether the price was high, witness said opinions differed. People who had been cured did not object. Langford suffered from miner's phthisis.

Mr. Gregory: I suggest that this disease does not consist merely of the hardening of the lung through inhaling dust?—Nothing of the sort. You know nothing about it. There is no inflammation. The lung becomes quite hard.

Continuing, witness said that when Langford complained of his slow progress, he wrote, "Rome was not built in a day." The man eventually died. When a friend of the widow wrote suggesting that as she was in poor circumstances the witness might return the money paid for a treatment that did not do its work, the witness replied that he considered it had done its work, as the miner had improved for a time. He received £10 but did not press for £6 10s. which was still owing. He had not guaranteed a cure. There were cases of miner's phthisis which he could not cure as they were too far gone. Outdoor treatment was not a cure for consumption where the disease had a fair hold. He had heard of mild cases being so cured. In another case where the patient had died he was asked to return the £2, not by the man's wife but by a friend of the patient. He was subsequently sued in the Southampton County Court for this sum.

Did the judge say this to you: "No, you may not appeal. I will now say what I think. I think that this is an intentional and well-considered fraud"?—Yes. He believed the other side. On an application for a new trial, the counsel for the applicant admitted that the defendant was entitled to it.

Mr. Justice Pickford: Is that so?

Mr. Gregory then read a report of the case in a paper, in which the learned counsel who appeared for the plaintiff in the county court admitted that technically a new trial might be granted.

Mr. Justice Pickford: That was not the sense in which I understood the witness to make the statement.

Continuing, witness said that on June 15th, 1907, he had a visit from a Mr. Archer, who came with his mother. He said he had been at the Brompton Hospital.

Mr. Gregory: Did you say the Brompton Hospital is no good?—I never said such a thing. I said it was a hopeless case, which I could not cure.

On June 26th did they pay you £2 12s. 6d.?—Yes, the lady paid for three months' treatment for her son.

On September 16th did he write you saying that he was no better, and asking for the money?—Yes, and I wrote telling him that I could not prevent his getting fresh cold.

It appeared from the letter, which Mr. Gregory continued to read, that the witness wrote: "I do not consider yours is a hopeless case."

Mr. Justice Pickford: If you told them it was hopeless in June, how came you to tell them that it was not hopeless in September?—I told the mother it was hopeless in June, but I told him the contrary in September in order to buoy him up.

Continuing, witness admitted that in December, after the boy's death, the mother wrote to say that the boy had not improved under his treatment. He replied to that, that he only intended to return the money if some benefit was not received. The remedy did not fail in this case, the boy's strength failed.

Mr. Justice Pickford: How do you distinguish between strength failing and the cure failing?—In this case he overdid it; he did too much. He walked too much.

Mr. Gregory: According to you, the young man was writing an untruth when he said, "you promised to return the money," and, "I followed your treatment"?—It is a lie. I think it is his mother's composition.

Continuing, witness said that in November, 1911, he sent medicine to, and saw, two clerks in the service of the Great Northern Railway Company, who were suffering from tuberculosis. He believed he gave them physic, and that he did not sell it to them. He did not ask such men to pay; they were in the last stages of the disease. They both died of consumption. A Mr. Smith also came to him as a personal friend. He was the manager's assistant. He said that owing to the two young men being ill, he was nervous about himself. Witness examined him, but did not tell him that his lung was diseased. He merely said it was abnormal.

Mr. Gregory: Did you not tell him that his lung was diseased and had been for three years?—No.

Did you give him a hypodermic injection?—Yes, because he was a friend and there was a danger of his getting consumption. I also asked him to let me have his sputum for examination.

Continuing, witness said that this man subsequently wrote him that he had consulted three doctors, who told him that there was nothing wrong with him. Returning to the books, witness said he did not think there was any entry in his books to show that money was sent to South Africa. In 1908–9, £457 17s. 6d. was spent on drugs and herbs. The total sales were £4,415, and there was stock in hand to the value of about £300. The words which he now complained of were first published on August 22nd, 1908, and he commenced the present action in June, 1911. He sent the medicine to his own analyst in December, 1911. The analysis made in 1908 was false as it could be. The reason why he did not proceed before was that he hated litigation, and did not expect that *Secret Remedies* would be so widely circulated.

Mr. Gregory: Why did you not send the medicine to the analyst before?—I do not want to answer that, as I might say some unpleasant things about the British Medical Journal. I had it analysed by Mr. Lord.

Continuing, witness said he was not sure whether he read an article in the British Medical Journal in September, 1909. He knew Dr. Porter, the medical officer of health of Johannesburg, and he got into hot water there through using witness's remedies. He also knew a Dr. Turner in South Africa. He also knew the senior Government analyst at Capetown.

Mr. Gregory: Would all these men be likely to know of the use of this drug by native doctors?—No, because they ignore the native doctors and know nothing about them.

Continuing, he said that when he was in Capetown he was carrying on a cycle business. He knew a tailor, called Myers, who was selling a remedy for consumption on his behalf. It was untrue to say that Myers had been selling the cure for years. He paid Mr. Myers £50 a month, and on one occasion when he paid Myers £50 he asked for £100. Witness then discovered deficiencies in his account, and decided to have nothing more to do with him. He paid Myers £50 a month because he had befriended him, and £30 a month for rent. The tailor was selling the stuff under the name of Stevens and Co. The accounts were not kept in his name, but he could draw cheques under a power of attorney. He never dreamt that Mr. Myers would rob him.

In re-examination, witnessed produced a bag of the root which he had obtained from South Africa. The bag was opened, and was said to contain chijitse and umckaloabo. He had been receiving it through Messrs. Dyer and Dyer since 1908. Smith, when he came to see him, said he had had a cough and

expectoration for six years. As to Archer he did not think he could cure him but he might ameliorate his condition.

Mr. Tindal Atkinson: Do you guarantee that a patient will not catch cold?—No.

Continuing, witness said that Bramley's case was not brought on the guarantee. Miner's phthisis was quite different from ordinary consumption. It was looked upon as incurable. His medicine was quite harmless; it would be impossible for it to do any one any harm. He was not anxious to enable other people to discover from where he got his materials. He did not pretend to give a man a fresh lung. As to the sickness after taking the medicine that was the necessary result. After two doses a lot of mucus would disappear from the stomach.

Mr. Justice Pickford: I do not understand your answer, "I do not pretend to give a man a fresh lung."—I mean I can cure a man who is in the beginning of the disease and might be given up by other persons.

Mr. Justice Pickford read from an advertisement issued by the plaintiff which stated that when patients had been given up by the doctors and disease was "slowly devouring all but your soul and bones" they should "send a postcard to Stevens." Does he now say that he only cures the disease in its incipient stages?

Mr. Tindal Atkinson: I don't suggest that he cures cases which are hopeless.

Mr. Neuter, F.I.C., Analyst to the Metropolitan Asylums Board, said that he was asked to test Stevens's consumption cure. His analyst made up two mixtures, one according to Stevens's recipe and the other according to the recipe on p. 32 of *Secret Remedies*. He thought the two were quite different.

Mr. Hodgson, an ironmonger from Clacton-on-Sea, having been called to prove that he was cured by the plaintiff, and Mr. James Muirhead, J.P., having been called,

Mr. Tindal Atkinson said that that concluded the plaintiff's case.

Mr. Gregory called Mr E. F. Harrison, B.Sc., analyst and consulting chemist, of Chancery Lane, for the defence. Witness said that he did most of the analyses for *Secret Remedies*. He ordered a bottle of Stevens's medicine, and received one with a number of documents. Upon analysis he found that it contained no medicinal activity except tannin and glycerine. His experiments showed that the medicine bore a strong resemblance to krameria.

Mr. E. F. Harrison, continuing his evidence, said that he made his analysis of Mr. Stevens's medicine in June, 1908, and that it occupied him a week. He made another analysis in April of this year, when he found that it contained, as compared with the first analysis, alcohol 14.3 instead of 22 per cent.; glycerine 7.1 parts in 100 instead of 1.8 parts. The tannin and ash were nearly the same as before, and the extractive was somewhat less. The general character of the medicine was about the same.

Cross-examined by Mr. Tindal Atkinson: He was paid for the analyses. He did not know whether Mr. Stevens supplied the medicine to him as a patient. He could not say that if the medicine contained tannin it was not prepared from the root. He did not know where the root came from or what it cost to get it, and his estimate in *Secret Remedies* that the medicine cost 1½d. was based upon its containing krameria.

Mr. Tindal Atkinson: Yet you stand in that box and say you don't know that it is krameria?—No, I don't.

Would not any one reading the book think you had satisfied yourself that this was krameria?—No, certainly not.

Continuing, witness refused to agree that if there were curative properties in this remedy the whole charge of swindling had gone. Counsel then read extracts from *Secret Remedies*, of which the witness admitted he was the author.

Mr. Atkinson: Did you wish to charge Mr. Stevens with being a swindler?—I wished to convey the impression that a prima facie case had—

Yes or no?—No.

After having heard the medical evidence in this case, would you still call him a swindler?—It is a somewhat nice point. The evidence requires to be very carefully weighed before I can answer it. I am waiting to hear the evidence criticized by medical men.

Witness said he had read the preface, and agreed that the analyses were carefully made. He did not remember having tasted every medicine or compound mentioned in the work. He had not tried any experiments since the action was brought. It would now be impossible to get the medicine which he had in 1908.

Mr. Tindal Atkinson: Would you like to taste a decoction of krameria and Stevens's preparation?—I am willing to do so.

Mr. Gregory: I object unless the medicines come from an independent source.

Mr. Justice Pickford: If the medicine comes from an independent source the test may be fair, but Mr. Gregory is entitled to object to a tincture which has not been prepared by an independent person.

The witness tasted the two decoctions. The flavours, he said, were substantially the same. There was a slight difference in the flavour due to the presence of alcohol in one and glycerine in the other. He had heard of a letter read which Mr. Stevens had written to the British Medical Association, but had made no further analysis in consequence.

In re-examination by Mr. Gregory, witness said that the description of his formula given by the plaintiff on the above-named letter meant nothing to any medical man. The herbs umckaloabo and chijitse were unknown to the profession. He had no knowledge even now, except that he gathered from the evidence that umckaloabo belonged to the natural order Polygonaceae. Colour tests were very difficult. He could find no alkaloid in the medicine he analysed. Not only that, he would definitely prove there was none there. He tested for a number of other active substances. Krameria was used for throat trouble at times; but he did not know this from making tests. The tannin in the krameria decoction was almost identical with the tannin in Mr. Stevens's mixture.

Mr. Charles Edward Sage, consulting and analytical chemist, F.I.C., etc., said that at one time he was pharmacist for the Mount Vernon Hospital, and had had much experience of analysing drugs. On April 24th, 1912, he was handed a bottle of Stevens's mixture. The mixture contained by weight, alcohol, 11.23; glycerine, 6.84; tannin, 1.04; organic colour substance, 2.76; mineral matter, 0.2; water, 77.93. The solids dissolved when the mixture was warmer. The solid substance consisted of one of the decomposition products of tannin. He found no alkaloids at all. He knew of five kinds of krameria, but was only acquainted with three. As to colour reactions, his opinion was that they were so modified by the presence of other substances that it was difficult to draw any conclusion from them. On testing a decoction of krameria, he found that it was similar to, but not precisely the same in its reaction as, Stevens's mixture. He was not satisfied that it did not contain krameria.

Cross-examined, witness said there was something in addition to tannin which he could not identify. It was a red-coloured substance which he could not follow up. Tannin occurred in many plants. He would not discard the colour tests altogether. In making tests the presence of glycerine would prevent precipitation. Treating Stevens's mixture and tincture of krameria with NaOH produced the same result so far as colour was concerned. When treated with HCl the colour was practically the same.

In re-examination witness said he was trying to identify something besides krameria, but he could find no other active medicinal ingredient.

Mr. Norman Reginald Williamson, M.B., B.Ch., who was in charge of the out-patients at the Royal Infirmary at Huddersfield, said that in 1908 he filled up a form for Stevens's medicine and obtained six bottles. His colleagues at the hospital were not very favourable to Mr. Stevens and they confiscated the medicine, so he obtained a fresh supply. He tried the medicine, hoping for the best. It never succeeded. Two patients died; he would not say that was the cause. He would not advertise Mr. Stevens, so he washed the labels off the bottle. On October 29th, 1908, he posted a letter to Mr. Stevens, stating that the medicine had been of no use, and asking him not to send any more pamphlets. He was attending as a witness merely because he saw the case in the paper. When the second lot of physic came he tested it, and found that a mixture made of syrup, kino, and krameria was very similar to that of Mr. Stevens's. At that time he knew nothing about *Secret Remedies*; it had not been published, and he had not seen the BRITISH MEDICAL JOURNAL, and was not a member of the Association.

Cross-examined by Mr. Tindal Atkinson, he said the first consignment was half a dozen bottles in a box. His colleagues said that it was derogatory to his position to communicate with Mr. Stevens. The house-surgeon knew nothing about the composition of the stuff. There were hundreds of things which had tannin in them. He tested it side by side with krameria. He tested it before he gave it to his patients. He thought krameria was harmful; but the quantity was so small that it would do no harm. He went on giving it for three weeks to one patient. In one case it showed some signs, but the patient said it was doing no good. He was testing it against his own medicine.

In re-examination he said that he tasted Stevens's medicine before he gave it to his patients. He had no interest in the case.

Mr. Wm. Smith, a clerk in the employ of the Great Northern Railway Company, examined by Mr. Colam, said he had paid a visit to Mr. Stevens to inquire about two fellow-clerks who had been treated. Upon his telling Stevens of his symptoms, Stevens gave him the impression that he was suffering from consumption. He subsequently gave him an injection and told him not to worry. The witness, however, was nervous about himself and went to see three doctors, who reassured him.

Dr. Howard Distin gave evidence to the effect that he had examined Mr. Smith and came to the conclusion that he was quite healthy. There was nothing abnormal about his lungs.

Mrs. Sarah Archer, examined by Mr. Gregory, said that she went to see Mr. Stevens with her son on June 26th, 1908. The boy told Mr. Stevens he had consumption brought on through pneumonia, and that he had been to the Brompton Hospital. Mr. Stevens said: "I can cure him." Witness said: "Can you cure him; he has been to Brompton Hospital?" Mr. Stevens said that Brompton was no good, and that his terms were £2 12s. 6d. for a three months' course. He also said that if they put £25 in a bag he would not take it out until two medical men certified a cure. She paid 5s. for a first lot of physic to stop the progress of the disease; later on they paid £2 12s. 6d. Her son took the medicine according to instructions, but he got no better. It did not even stop the sickness as Mr. Stevens said it would.

In cross-examination, witness said her son had been an in-patient at Brompton Hospital for ten weeks. He had been getting worse, and sometimes became prostrate. She did not know that he was suffering from an affection of both lungs.

She did not know that her son had written to Mr. Stevens. He did not improve when he took Mr. Stevens's medicine. He was able to walk before he took it.

Mr. Atkinson: Did he catch a fresh cold? That was what Mr. Stevens said when I told him that the treatment was doing him no good.

Dr. Theodore Dyke Acland, Physician to St. Thomas's Hospital and Consulting Physician to the Brompton Hospital, said the whole of his medical life had been spent in the study of tuberculosis and diseases of the chest. Tuberculosis and miner's phthisis had both been mentioned. The origin of tuberculosis proper was the tubercle bacillus. The disease could not originate *de novo*. It was a specific form of inflammation which took the form of small nodular masses round the blood vessels. That was the form it took in children. If the poison was taken by inhalation into the lungs, the result was tuberculous bronchopneumonia. Miner's phthisis was a chronic disease of the lung caused by the inhalation of solid particles of dust. If the dust was flinty, the disease was called silicosis. In the case of stonemasons, potters, and grinders the same thing went on, leading to the formation of great masses of fibrous tissue. The irritation caused by this dust made the lung more susceptible to ordinary phthisis, the subject being likely to get that disease superimposed. When a man had consumption he was formerly thought to have one foot in the grave. A man might be tuberculous without knowing it. A large proportion of the population had had it in the lungs. If the disease was unarrested, cavitation took place. Minute ulcers were formed owing to the blood supply being cut off. The whole lobe of a lung being scooped out might lead to the healing of the patient. The cure of tuberculous places might take place: (*a*) By absorption; (*b*) by becoming calcareous; (*c*) by becoming fibrous; (*d*) by expectoration. As far as was known, there was no way of curing this disease. Every kind of antiseptic had been tried, and failed because the infected place was *de facto* cut off from the circulation. The tubercle bacillus was entrenched behind its inflammation, and nothing put into the blood could reach it. The method generally tried was that of increasing the power of resistance. Since Dr. Koch's great discoveries of 1883 and 1890, another method was that of giving tuberculin injections. The object of that was to make the body work out its own salvation. He never said he cured patients, but he had put them in such a position that they recovered. Applying the tuberculin and serum treatments in time, many patients recovered. Much depended upon the nature of the complaint. It did not follow that because a man had a cavity in his lung he was incurable. It was very easy, however, to say by looking at a patient's temperature chart whether he was incurable, and there were, alas! many such in the country. He had been through all the evidence and he found no proof of any cure by Mr. Stevens's mixture. One doctor had said that as a result of taking the medicine in one case the sputum had diminished, but on the evidence there was no safe deduction to be drawn. In another case Dr. Grün had said: "The boy had no temperature but the disease was still active." That was an absolute contradiction in terms. It was impossible. Unless he had fever he could not have active disease. The same doctor had said (with reference to another case), "The disease was said to be more or less latent but was very acute." That was like saying a cold bath was very hot. In another case the patient had been told that "The fire was out," "that the disease was dead and he must keep it dead," and "that his lung was like a dried-up piece of leather." That did not convey to him that the patient was suffering from tuberculous trouble. As to the fourth case mentioned by Dr. Grün, the patient died. It was said that he died of pneumonia, but it was quite evident that he died of some acute inflammation of his lung.

Mr. Gregory: Even if he did die from pneumonia, what deduction do you draw from that?—That the medicine was of no effect.

Continuing, witness said that the test adopted by Dr. Grün to prove the absence of tubercle bacilli was absolutely useless. It would prove that bacilli were present, but was not a safe test that they were absent. That was his actual experience. With regard to another case in which the patient had his chest poulticed, that was a treatment for bronchitis. The case in which a man, after coming out of the sanatorium, had coughed up a large amount of sputum was a perfectly ordinary case. The cavity was cleared out. He knew two men who lived for twenty-nine years after such an occurrence. The medicine had nothing to do with it. As to the doctor at St. Leonards, there was no evidence in his (witness's) opinion that the drug had cured any one of these three people. With regard to Charles Day, the clerk in the Great Northern office, there was no evidence that the physic cured him. To give a man who had an internal abscess a medicine of this character was gambling with his life. The man owed his life to the fact that the abscess burst externally instead of internally. He had known cases of that kind where an abscess had broken internally and the patient had recovered without the use of any drugs. He won the toss.

Mr. Justice Pickford: Who? Mr. Stevens?—No, my lord, the patient. He would probably have died if it had burst internally.

Questioned with regard to a witness who had said that she was discharged from the Brompton Hospital as incurable, witness said it was probable that when in the hospital she had injections of tuberculin, and had febrile reactions. In the result she probably got discontented and left. Patients were often unwell after an injection. It would ultimately have had a good effect upon her. There was nothing unusual in her case. She was all right after two years.

Mr. Justice Pickford: It was a genuine case of tuberculosis? Was she cured by tuberculin, Mr. Stevens's medicine, or by nature?—By nature, my lord.

Continuing, witness said there was nothing in Mr. Stevens's medicine which was a germicide. Even assuming that the use of the medicine assisted the cough, that was no evidence that it was a germicide. A mixture containing a vegetable product containing tannin with glycerine would assist a cough. With regard to the clergyman who had been called, there was no satisfactory evidence that he had recovered. Witness had not examined him, but he did not look as if he had recovered. As to another patient who was alleged to have recovered, many cases got well without drugs. One patient had said that one dose of the medicine had stopped blood spitting. That was impossible, even if the medicine was a powerful germicide.

WORKMEN'S COMPENSATION.

Typhoid Fever an Accident.

In the case Cartlidge *v.* Grant and Sons (Tunstall, September 11th), a bricklayer sought compensation in respect of typhoid fever alleged to have been contracted while working at a cesspool. In giving judgement, His Honour said that the question arose, Was this a disease which might be called and properly described as an accident within the meaning of the Act? In this case the operation of cleaning the cesspool took place on one day in October, 1911, and whatever the day was, it was a particular operation which took place on one day and one day only. On that particular occasion the man had to lay the footings of a new wall, which extended for some considerable distance. In the course of that work he came upon an old disused cesspool. The cesspool was cleaned out or partly cleaned out. This man's primary duty was to lay a wall across the cesspool. The whole operation only took two or three hours, with an interval for dinner. He accepted the applicant's statement that the cesspool was very foul, and that the stench was most objectionable. He said to his employer that it was "hot stuff," and his employer said it was, and that he must get on with it as quickly as he could. Although the cesspool was said to be cleaned out, the evidence was that it was not entirely cleansed, and that there were parts of the objectionable matter adhering to the sides and bottom of the cesspool and to some of the old bricks. In building up the new footing the man had to make use of the old bricks to some extent, and he could not keep his hands entirely free from the objectionable matter. He took his pipe out of his waistcoat pocket with the hand with which he laid the bricks, and put it in his mouth and tried to smoke, but found he could not do so, as he felt too sick. He put two fingers down his throat, the idea being to make himself vomit. He went on with the operation for two and a half hours, getting further and further away from the place. He was ill the next day, and from that time forward for the next week or so. A doctor was called in, and within the ordinary period of incubation in that disease it was found that the man was suffering from typhoid fever, and he was sent to the fever hospital. On those facts he found that during the period which the man worked at the cesspool he did, in fact, contract typhoid germs. It was said by medical men the germs might be carried into the system, and they were generally carried either by food or the fingers, and in this case his opinion was that it was carried into his system by the fingers, and resulted in fever. It was suggested that it might have been carried in by food. Applicant was a healthy man, and his family with whom he lived were healthy. He had the same food as his family, and no one else suffered from typhoid fever. On these facts he was driven to the conclusion that typhoid was contracted during the operation on that day. Then came the question: Was it incurred by accident? Was there sufficient definiteness as to time, place, and circumstances? The circumstances were clear and the operation was clear. As to the day, he thought that, too, was clear. He was bound to say that in the present case there was some doubt, but he thought it was on the right side of the line. It might be that if the case was taken higher the Court of Appeal would say that he was wrong. He awarded compensation at the rate of 17s. 2d. per week for the period between October 28th, 1911, and February 25th, 1912.

The number of persons who graduated in medicine in Italy in 1910 was 643. The number of students registered in all the universities of the kingdom in the academic year 1910–11 was 4,326.

The number of male wage earners engaged in agricultural pursuits in Great Britain is estimated to be about 800,000; their average weekly wage is estimated to be a little over 18s. The number of women, boys, and girls so employed is said to be 550,000, and their average weekly earnings would appear to be a little under 10s., but the amount is probably very unequally distributed throughout the year.

Messrs. F. H. Angus and Co., of 83, Wigmore Street, have published a new catalogue descriptive of the hiring and second-hand scientific instrument department established by the firm a year or two ago for the benefit of those whose work has outgrown their apparatus, or who wish to try some particular experiment without involving themselves in any large outlay.

Public Health AND POOR LAW MEDICAL SERVICES.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

Dublin.—The report of the medical officer of health of Dublin for 1911, just published, contains some features that are satisfactory. There was only a fractional decrease in the birth-rate, and the death-rate was more than 1 per cent. below the average for the last ten years. But the chief impression after reading the report is one of horror at the terrible conditions under which the very poor in Dublin still continue to live. There are 21,133 single-room tenements in the city. Of these more than 2,000 are occupied each by five persons, nearly 1,500 by six persons, 854 by seven persons, 431 by eight persons, and 146 by nine persons. The history of the tenement system in Dublin is traced in the report, showing how, owing to the gradual exodus of the rich people from Dublin to the surrounding country, luxurious houses declined into unsightly areas of disease and squalor; this is specially true of the north side of the city, where large numbers of big houses are filled from roof to basement with the families of the very poor. The inspection of these tenement houses occupies the attention of forty sanitary officers, each of whom is responsible for about 1,600 rooms. This supervision is quite inadequate, and the sanitary accommodation is a blot on the tenement house system in Dublin. Side by side with the overcrowded tenement houses are 519 waste spaces, on which 1,294 houses once stood, and there were more ruinous houses and waste spaces in 1911 than in any previous year. No doubt a great deal has been done in recent years to improve this evil, but this report will convince anybody that the work has only been begun, and that it is in crying need of early completion. As showing the large amount of sanitary work that is being done in Dublin at present, the following details may be quoted from the last fortnightly returns of the medical officer of health. During the two weeks ending October 12th, 1912, 83 samples of food were collected for analysis, 1,655 insanitary defects discovered, 1,243 defects remedied, 583 notices to abate nuisances served, 74 sanitary summonses heard, 22 magistrates' orders for abatement of nuisances made. The following were inspected: 3,637 houses, 9,456 rooms, 58 common lodging-houses, 43 offensive trade premises, 140 workshops, 271 dairy yards, 697 milkshops, and 133 slaughterhouses. From this list of work done in a fortnight it would appear that the 40 sanitary officers are kept busy.

Walsall County Borough.—The estimated population of Walsall at the middle of 1911 was 92,273. The birth-rate during the year was 28 per 1,000, and the death-rate from all causes 15.8 per 1,000. The rate of infant mortality was 152 per 1,000 births. Of the 424 deaths occurring among children under twelve months old, no fewer than 113 were due to diarrhœa and enteritis. Several pages of the report are devoted to a consideration of infantile deaths. A large proportion of the children who died from diarrhœa were bottle-fed, and this, writes the medical officer of health, Dr. Harry Shore, could hardly surprise any one who had opportunity of observing the plague of flies which swarmed everywhere and over everything in the more crowded streets and courts of the town. On another page he states that the more frequent removal of domestic and other refuse from the vicinity of houses is most requisite. It is surprising to find that in a town of the size of Walsall refuse is still disposed of by depositing it on tips, and that no destructor has been installed. In spite of the recommendation of Dr. Shore as to more frequent removal, the Streets Committee of the Corporation decided to adhere to the practice of emptying ashpits only on receiving complaint from the tenant or owner of the dwelling to which the ashpit adjoined. As a fact, the inhabitants have the remedy in their own hands, for the Corporation is liable to a daily penalty for failing to empty an ashpit at the expiration of seven days from notice having been given by the occupier of the house in question. The Corporation would be well advised to give effect to the advice of its medical officer of health in this matter, and also in that relating to the establishment of a public abattoir. It must be next to impossible with the limited number of inspectors (four) to inspect satisfactorily the forty-three private slaughterhouses in the borough. The only isolation hospital is one devoted entirely to the isolation of typhoid fever. Cases of scarlet fever, of which in 1911 there were 229, with three deaths, are all treated in the homes of the patients. Among about 1,100 houses inspected during the year under the Housing Regulations, over 600 had defects requiring to be remedied, and 76 were represented by the medical officer of health as unfit for human habitation. There is evidently plenty of work ready to the hands of the sanitary authority if it would only bestir itself.

City of Westminster.—The population of the City of Westminster at the 1911 census was 160,261, compared with 183,011 in 1901. The birth-rate in 1911 was 14.7 per 1,000 and the death-rate from all causes 12.5 per 1,000. The medical officer of health, Dr. F. J. Allan, points with satisfaction to the progressive improvement in the death-rate since the formation of the city. The average death-rate in the previous ten years was 18 per 1,000, and in the last ten it was only 13.6 per 1,000. Infant deaths, which had been for many years as high as 164 per 1,000 births, have fallen during the past ten years to 115 per 1,000. There was a low death-rate from diarrhœal diseases, a fact ascribed by Dr. Allan to the frequent inspection of tenement houses, resulting in a higher standard of cleanliness and the removal of insanitary conditions, the instruction given to parents by the health visitors, and the extension of the system of the daily removal of house refuse and the general cleanliness of the streets. Ophthalmia neonatorum has been compulsorily notifiable since March 13th, 1911. Notifications of 16 cases were received during the year, and 7 others were discovered by the health visitor in the course of her work or intimated by the inspectors of midwives. In each instance the health visitor visited the house in question daily or less frequently, as the circumstances demanded, and took steps to see that proper medical and nursing attention was secured for the child. The means adopted in Westminster for the prevention of consumption include the visiting of notified cases at their homes by the phthisis visitor or by voluntary health visitors, who give instructions as to measures of personal hygiene and precautions against infection, etc.; examination of suspected and "contact" cases in the families of patients attending certain special and general hospitals; bacteriological examination of sputum; educational training by a short stay at a sanatorium at the cost of the city council; prolonged sanatorium treatment at the cost of charitable and other organizations; convalescent homes, boarding-out treatment, and the provision of additional food for delicate children in consumptive families by charitable bodies; provision of sputum flasks and disinfectants, beds and bedding to enable patients to sleep alone or in outdoor shelters; disinfection of rooms, bedding, clothing, etc., after death or change of address; and the removal of insanitary conditions of dwellings and workplaces.

NUMBER OF VACCINATION MARKS.

JACOBUS.—The difficulty as to the question of the number of vaccination marks has been commented upon frequently. Where a parent consents to a child being vaccinated, but objects to four scarifications being made, a clear explanation of the disirability of affording the greatest possible protection will often overcome the objection. In cases where the parent insists upon having only two or three insertions, the area of the scarifications should be made larger than if four were obtained. Public vaccinators are required by the regulations under which their contracts are made to aim at securing four vesicles. In exceptional cases, where fewer than four insertions have been made, the public vaccinator is required to enter the fact in his register, and he may be called upon to give an explanation to the medical inspector of the Local Government Board. If unsatisfactory or frequently recurring the grant available for that public vaccinator might be cancelled. A public vaccinator would be most indiscreet who offered a bonus to the parents of children who showed on inspection four good vesicles. The case would be different if some such course was adopted by a Government in sympathy with vaccination. In some countries something of this kind is done. In Spain, for example, a lottery ticket is given to the parent of each child vaccinated. At present the tendency of recent legislation has been to discourage vaccination in this country.

HOURS OF ATTENDANCE AT SURGERY.

HERNIA.—A district medical officer, who is non-resident, but has a surgery within his district, asks if the guardians can fix the hours he is to spend at the said surgery.

*** The guardians have no power under the Poor Law Orders to fix such time. It would be otherwise if the medical officer on his appointment had agreed to spend a certain time each day at this surgery. Under the Metropolitan Dispensaries Order of April 22nd, 1871, power was given to fix a time where dispensaries were provided by the guardians, but Article 10 of that Order contains the following: "And we do hereby order, as regards every such officer (district medical officer) *when a dispensary shall have been established for his district*, that it shall be his duty," etc. This clearly implies that where the guardians do not provide dispensaries the provisions of this order are not binding on the district medical officer.

Universities and Colleges.

CONJOINT BOARD IN ENGLAND.

THE following candidates have been approved at the examination indicated:

FIRST COLLEGE (*Part IV, Practical Pharmacy*).—G. Arnfield, G. Bailey, A. R. Bourgault-Ducoudray, E. R. Chambers, W. H. W. Cheyne, F. Collar, H. E. Cresswell, R. S. Fawssett, A. P. Ford, M. R. V. Ford, J. L. A. Grout, M. S. Hamilton, F. C. Harrison, J. A. Hart, W. O. Holst, E. L. Hopkins, T. H. W. Idris, J. W. Kemp, G. Lynden-Bell, C. V. N. Lyne, W. Marriott, R. Moser, H. F. Mullan, A. E. Panter, J. A. Perera, A. C. Pickett, L. C. Smith, M. L. Treston

Obituary.

FRANK M. POPE, M.D.CANTAB., F.R.C.P.LOND.,

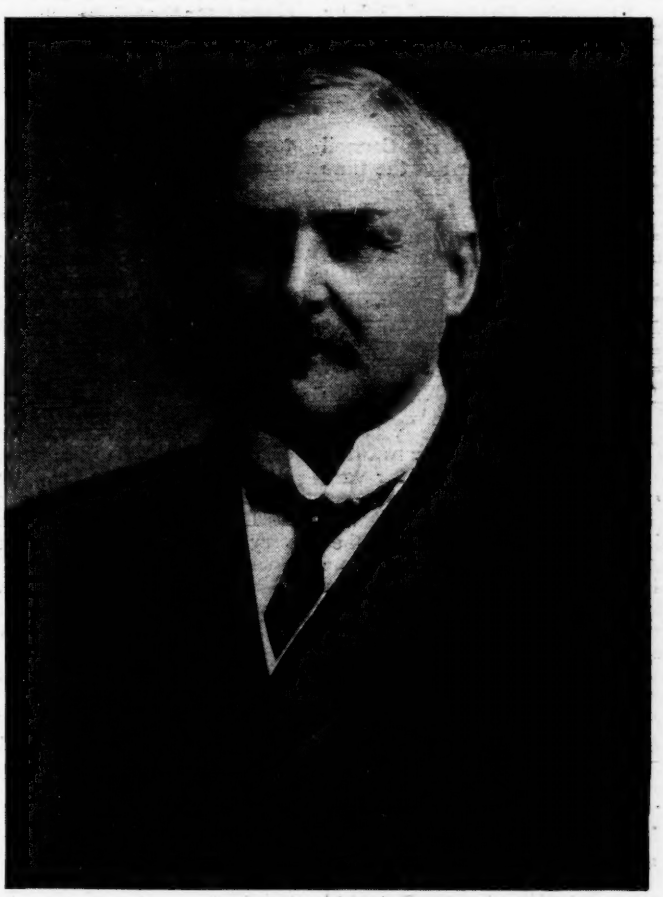
CONSULTING PHYSICIAN TO THE LEICESTER INFIRMARY.

IT IS with extreme regret, a regret which will be shared by a very large number of members of the British Medical Association, that we have to record the death of Dr. Frank M. Pope, of Leicester, in his 57th year. He had not been in quite his usual robust health for some months, and about two months ago suffered an attack of cerebral haemorrhage; after some temporary improvement a fatal extension occurred on October 26th.

Frank Montague Pope was the son of Mr. Thomas Pope, of Harewoods, Bletchingley, Surrey, and received his early education at the Leeds Grammar School. At the age of 16 he became a pupil of one of the members of the staff of the Sussex County Hospital, Brighton, and attended that hospital for some years. He then entered Magdalene College, Cambridge, and graduated B.A. in 1877, taking honours in both parts of the natural science tripos.

From his earliest years, stimulated in that direction no doubt by Dr. Gorse physician to the Middlesex Hospital, an old friend of the Pope family, he had desired to enter the profession of medicine, and his period of work at Brighton was in preparation for this. On leaving Cambridge he went to St. Bartholomew's Hospital; he obtained the diploma of M.R.C.S.Eng. in 1879, and two years later graduated M.B. at Cambridge. He became in succession assistant house-surgeon to the Great Northern Hospital and house-physician to the Royal Hospital for Diseases of the Chest, City Road. He was also for a time resident at the small-pox hospital, Stockwell.

In 1883 he went to Leicester as a partner of Dr. Mutch, who very shortly afterwards left Leicester, and Dr. Pope then struck out a line for himself in medicine.



Photograph by] FRANK M. POPE. *[Elliott and Fry, Ltd., London.*

In 1886 he became a Member of the Royal College of Physicians of London in preparation for his candidature for the appointment of Honorary Physician to the Leicester Infirmary. A closely contested election ensued, the appointment then being determined by the votes of all the governors of the Infirmary, who numbered about 800. Dr. Pope was elected by a small majority, and the governors at the same time instituted the office of assistant physician and appointed the rival candidate to that office. For the ensuing twenty-six years Dr. Pope was a valued member of the staff of the Leicester Infirmary, and for the ten years preceding his resignation last March he was senior physician and chairman of the medical staff. During his chairmanship important alterations and extensions of the infirmary took place, and he was keenly interested in each successive development. On his retirement he was elected consulting physician. He was also consulting physician to the Leicester Institute for Trained Nurses, and the Nurses Association in Leicester found in him a valued friend and a regular attendant at its committee meetings. He was consulting physician to the Leicestershire and Rutlandshire County Lunatic Asylum a visitor of private lunatic asylums in the county of Leicester, and a member of the Advisory Committee of the Society for the Feebleminded.

Dr. Pope became interested in the British Medical Association soon after he settled in Leicester, and before long gave so much time and energy to the work, that for some years its fortunes in the Midlands east of Birmingham largely depended on him. He made himself thoroughly acquainted with its machinery, was returned to the Council, of which he was the senior member at the time of his death, served on many committees, and frequently intervened with effect in debate. Holding his opinions strongly, confident in his cause, and no respecter of persons, he often had the courage to say what others were thinking with a force and directness which usually hit the mark, though sometimes, perhaps, it overshot it. That he was sincerely and unselfishly devoted to the interests of the profession and thoroughly believed in the value of the services which the Association could render to it, was evident in all he said and did, and especially in the advice he gave in moments of difficulty. He took opposition in good part, without rancour, and his own disinterestedness was always evident. He held many offices in the Association. He was Secretary of the Section of Medicine at the annual meeting at Nottingham in 1892, and President of the same section at the annual meeting at Leicester in 1905. In the organization of that meeting he worked hard, and not a little of its success was due to his labours and influence. To the interest he took in the scientific work of the Association and in its Library, and to his chairmanship of the Science Committee, Mr. Andrew Clark refers below.

He was president of the Leicester Medical Society in 1900, when its centenary was celebrated. He presided over the dinner given by the society on that occasion, which was attended by a number of distinguished guests.

Dr. Pope was a man of great energy, and found vent for his activity in many directions. In his early years in Leicester he was much interested in the work of the St. John Ambulance Brigade. He was chief surgeon to the Leicester division at the time of his death, and was an honorary associate of the Order of St. John of Jerusalem. For his energetic work in local organization during the South African war he received the South African medal, and when the Territorial Force was constituted he became lieutenant-colonel of the Fifth Northern General Hospital, and was an officer available on mobilization.

Dr. Pope was not a voluminous writer; he was the author of an essay on resorcin in the treatment of gastric ulcer, of papers on intestinal antiseptics, on colitis polyposa, on the cause of mental deficiency in children and of a careful description of a remarkable case of ochronosis. He was one of the first to call attention to the reckless sale of diachylon in the Midlands as an abortifacient, and wrote on the acute plumbism which may be produced in this way.

Dr. Pope was a man of sturdy build and athletic habits. When at Cambridge he was captain of the Magdalene College Rugby Football team; later in life he became an ardent golfer, and attained considerable skill in the game. He was a genial companion, and seemed always blessed with an enviable equability of temper. His strong sense of humour probably saved him many a heartache, and was one of the secrets of his influence with men of very diverse temperaments.

Dr. Pope leaves a widow and one son, who is now at Cambridge. Great sympathy will be felt with them in their bereavement.

The funeral, which took place on October 30th, was attended by many members of the staff of the Leicester Infirmary and other members of the profession in Leicester and the Midlands. The British Medical Association was represented by Dr. Carline (Lincoln) and Mr. Guy Elliston, the President of the British Medical Association by Dr. Pratt, the Nottingham Medical Society by Dr. Boobbyer, the Cambridge University Graduates' Club by Mr. G. R. Girling. A detachment of the St. John Ambulance Brigade was present, as were also the Matron and representatives of the staff of the Leicester Infirmary.

Mr. ANDREW CLARK, who was Chairman of the Council of the British Medical Association during part of the time for which Dr. Pope served on it, writes:

I gladly accept the invitation to write a few words in appreciation of Dr. Pope, more especially as regards his work in connexion with the Association. His death must have been a great shock to many who knew him, and had seen him so recently, apparently in perfect health. He was a member of the Council during the whole of my term of office as Chairman, and I was always struck with the trouble he took to make himself acquainted with all matters that appeared on the agenda for the meetings, and, having formed an opinion on any subject, he always expressed himself boldly and fearlessly. He was an active worker on several committees, and I may mention that the Association is much indebted to him for very good work and many valuable suggestions on the old Premises and Library Committee, of which he was a member during the time of the rebuilding. Another committee in which he was much interested was the Scientific Grants Committee, which was abolished under the new constitution in favour of the Science Committee, of which he became a member; at the time of his death he was its chairman. To it the supervision of the Library was allotted, and many of the improvements in its arrangements and in the establishment of a lending library are due in a great measure to his energy and guidance.

ANDREW DUNCAN, M.D.LOND., F.R.C.P.LOND., F.R.C.S.ENG.,

PHYSICIAN TO THE SEAMEN'S HOSPITAL SOCIETY.

As briefly recorded last week, Dr. Andrew Duncan died in a nursing home on October 17th, at the close of a long illness. Born in 1850, he entered Cholmeley School, Highgate, a few years after the revival of the old foundation, under a somewhat famous schoolmaster, John Dyne. He passed on to King's College Hospital in 1868, and became M.B.Lond. in 1874. He held sundry tutorial appointments until the end of 1878; he then entered the Indian Medical Service, and left it twenty-one years later to commence a career in London as a specialist in tropical diseases.

The foregoing is a skeleton outline of a life which should have included much more public honour than ever fell to the lot of Andrew Duncan. His record in what may be regarded as the student portion of his career has probably never been exceeded in brilliancy. Entering King's College Hospital as Warneford scholar, he won, among many awards, the Leathes prize and senior scholarship, and at his M.B. examination in 1874 the gold medals both in medicine and in midwifery, as well as honours in forensic medicine. He also won the gold medal at the B.S. examination in 1876, and a year later was admitted F.R.C.S.Eng. Meantime he had filled several junior appointments, including house-surgeoncies at King's College Hospital under Sir William Fergusson and others; the post of house-physician at the Seamen's Hospital, Greenwich; and the medical registrarship at Charing Cross Hospital. After taking the fellowship he returned to his own hospital as surgical registrar, and then moved to St. Mary's as medical tutor and pathologist.

A man with such a record could not possibly have been overlooked when vacancies on the ordinary staffs of hospitals and schools were going; but unfortunately, instead of remaining in London, he decided to join the Indian Medical Service.

The first year or two of his connexion therewith was in keeping with his early career, for, entering as second on the list of successful competitors, he won the Parkes medal at Netley, and very soon after his arrival in India, won distinction under Lord Roberts in the Afghan war of 1878–80, being mentioned in dispatches and severely wounded at the battle of Charasiab.

But apart from these features the twenty yearsor so he spent in India must be regarded as in the nature of an eclipse, for though he received the steps in rank to which his seniority at various dates entitled him, his abilities were never utilized by his being appointed to any of the important civil appointments commonly held by officers in the Indian Medical Service. Duncan, indeed, was regarded by many as exemplifying a belief commonly held in regard to many services, though rarely expressed otherwise than *sotto voce* by those who are still members thereof. This is, that mental brilliancy, even when accompanied by a capacity for hard work, is no passport to success, but may even prove somewhat of a handicap to a man who is not also possessed of a dominant personality.

While still a junior officer Duncan wrote a paper on sanitation, which was regarded as a reflection on his superiors, and *post hoc* or *propter hoc* his career in India was of the nature stated. He would no doubt have been wiser to keep his views to himself, but that those views were right is proved by the fact that most of the practices which he condemned have now long since been abandoned; while the same views, when expressed in the form of an essay, won him from the home authorities the Parkes Memorial prize. On completion of twenty-one years' service he resigned upon pension, and took up work in London, where his arrival was welcomed. He was very soon appointed physician to the Seamen's Hospital Society, and was elected a fellow of King's College in 1902; while later on he became lecturer at the School of Tropical Medicine, an examiner in tropical medicine at London University, and a lecturer on tropical diseases at Westminster Hospital medical school. He was also physician to the Western General Dispensary, and in 1907 was elected to the fellowship of the Royal College of Physicians. A good deal of his time was occupied in literary work, sometimes published under his own name, sometimes anonymously. Among books there stand to his credit *The Prevention of Disease in Tropical and Subtropical Campaigns*, this being an extension of his Parkes essay and, in effect, a textbook on tropical diseases. It was published while he was still in India, and later on there appeared *A Guide to Nursing in the Tropics*, and *The Practitioner's Guide*; of the latter he was joint author. He was also the writer of several articles on tropical diseases in the third edition of Quain's *Dictionary of Medicine*, and published a good many papers in *International Clinics* on allied subjects. Personally he was a high-spirited man, absolutely sincere in his friendships and in the expression of his opinions, and of cheerful, fearless disposition.

DR. HEARSEY, P.M.O. Nyasaland Protectorate, in his *Sleeping Sickness Diary* for June states that 13 additional cases of sleeping sickness have been notified during the quarter ending June 30th, 1912. These, added to the 63 cases previously recorded, brought the total up to 76. Two cases of the disease had also been recorded from Portuguese East Africa, one a European elephant hunter, the other a native. As regards the latter, Dr. Wigan, who reported the case, states that the man had pain and weakness of his legs, with tenderness to deep pressure, marked anaemia, enlarged lymphatic glands, rise of temperature in the evening, and numerous trypanosomes in the blood. Administrative measures are now being carried out in Nyasaland to prevent the spread of the disease, and it is to be hoped that these will be successful.

Medical News.

THE annual dinner or the Royal Navy Medical Club will be held at Princes' Restaurant, Piccadilly, on November 9th, at 8 p.m.

DR. HENRY EDGAR WILLIAM HOFFMEISTER has been appointed a member of the Fourth Class of the Royal Victorian Order.

THE late Sir William Japp Sinclair, Professor of Obstetrics and Gynaecology at Victoria University, Manchester, left £856.

THE name of Dr. A. M. Williamson has been added to the Commission of the Peace for the county and city of Edinburgh.

THE late Mr. Leonard Arthur Bidwell, Dean of the West London Post-graduate College, left estate of the gross value of £12,223, of which the net personalty has been sworn at £8,305.

THE Swedish Medical Society has conferred the Retzius gold medal on Dr. John Newport Langley, Professor of Physiology in the University of Cambridge, for his works on the nervous system.

DR. H. COLLEY MARCH (Portesham), Dr. W. Burrough Cosens (Dorchester), and Dr. Peter William MacDonald (Dorchester) have been appointed Justices of the Peace for the county of Dorset.

THE Honorary General Secretary of the Seventeenth International Congress of Medicine, to be held in London next August, asks us to state that no photograph album of the congress is either issued or contemplated by the authorities of the congress.

THE *Aberystwyth Observer* for October 26th contains a notification from Dr. G. R. E. Bonsall of his intention to retire from the Municipal Council, on which he has held a seat for the last three years, and an editorial note on the subject expresses the general regret at this decision, Dr. Bonsall having proved himself of great assistance during his tenure of office.

IT is announced that the Liverpool School of Tropical Medicine is arranging to send an expedition to Jamaica and the West Indies with the co-operation of the Colonial Office. This will be the twenty-ninth expedition made under the auspices of the school. The expenses of these expeditions are estimated at about £30,000.

A NEW catalogue of their various microscopes has recently been brought out by Messrs. Leitz (18, Bloomsbury Square) together with some pamphlets descriptive of a special eyepiece for demonstration purposes of recent invention, and a haemacytometer representing an adaptation by Professor Sahli of Hayem's method of corpuscle counting.

THE Departmental Committee on the Public Veterinary Services, of which Sir Alfred Hopkinson, K.C., is Chairman, held its first meetings on October 18th and 19th, at Winchester House, St. James's Square, when witnesses representing the Colonial Office, India Office, the Army Veterinary Service, the Royal Veterinary College, London, and the Royal Veterinary College of Ireland, Dublin, gave evidence.

THE annual dinner or the staff and past and present students of the Royal Dental Hospital of London will be held on Saturday, November 23rd, at the Hotel Metropole (Whitehall Rooms), under the presidency of Mr. J. Howard Mummery. Gentlemen either now or formerly connected with the hospital or medical school who may not have received special notice, and who desire to be present, are requested to communicate with the Dean at the Royal Dental Hospital, 32, Leicester Square, London.

On October 26th the first annual dinner of the Beit Memorial Fellows for Medical Research was held at the Trocadero Restaurant, London. A large number of Fellows were present, and the meeting proved a great success. Letters were received from Mr. Otto Beit and Sir James K. Fowler, expressing regret at their unavoidable absence, and conveying to the Fellows their best wishes for the success of the evening. It was unanimously resolved that telegrams should be sent to both these gentlemen conveying the greetings of the Fellows, and the hope that they would be present at the next dinner. It was also resolved that the dinner should become an annual event, to which all past and present Fellows should be invited, and that it should be held on the fourth Saturday in October in each year. Dr. F. W. Edridge-Green has undertaken to arrange the dinner for next year, in succession to Dr. E. Hindle, who was responsible for the arrangement of the first dinner.

IT will be remembered that at the end of April Mr. Wedgwood in the House of Commons asked the Home Secretary whether he could see his way to extend the terms of reference to the Committee inquiring into industrial diseases that could be added to the third schedule of the Workmen's Compensation Act so that they might consider the addition of writer's cramp among the diseases for which compensation is payable. Mr. Ellis Griffith, who replied, said that the Home Secretary would be prepared to consider the question, but that no representations had previously been made to the Home Office on the subject. The Home Secretary has now requested the Departmental Committee to consider and report to him whether writer's cramp should be included under the Act. Any communication on the subject of the inquiry should be addressed to the Secretary to the Committee at the Home Office.

THE members of the Associated Physicians of Long Island recently adopted a resolution prepared by a special committee, setting forth the necessity of educating the public to a better understanding of the value of necropsies in the advancement of science. In adopting the report (says the *Medical Record*) many of the medical men present agreed to sign a form containing a request that in the event of death their heirs should consent to the performance of a necropsy, since it was their opinion that in beginning a campaign of education to overcome the popular dislike of a *post-mortem* examination, it was their duty to set an example. In connexion with this matter, we may recall the fact that at a time when a violent prejudice existed against dissection, James Macartney, whose teaching of anatomy was a powerful influence in the development of the Medical School of Trinity College, Dublin, offered his own body for dissection, and induced a number of notable persons to follow his example.

WE are informed that the first general meeting of the State Medical Service Association, which was inaugurated at Liverpool in July last, was held in London on October 25th. The secretary reported that as a result of sending out 625 circulars 135 medical men had become members and a few laymen. The chairman, Professor Benjamin Moore, laid stress on the fact that the great aim of the association was gradually to educate the medical profession and the public to the need of a State medical service, which should put professional advice at the ready disposal of every member of the community who needed it, with a view to the prevention of disease. An executive committee was appointed, with Dr. G. A. Heron as chairman, and arrangements were made for the formation of district branches. Negotiations for the issue of a weekly journal, as the official organ of the association, to be entitled *The Medical World*, were completed.

THE usual monthly meeting of the Executive Committee of the Medical Sickness, Annuity, and Life Assurance Society was held at 429, Strand, London, W.C., on October 18th, Dr. F. J. Allan in the chair. The accounts presented showed that there was a diminution in the number of claims for the month of September, and, although the amount paid away was heavy, it was under the expectation. The audited accounts and balance-sheet for the half-year ending June 30th were presented. The funds of the society now amount to over a quarter of a million and provide ample security for the satisfaction of any claims that may be made. That large funds are required is evidenced by the fact that over £15,000 was paid in sickness benefit last year, and that this sum is likely to be exceeded during the current year. The bonuses being paid to members who attain the age of 65 and to the representatives of those who die before that age amounted to £1,200 for the period under review. That this result has been attained is due entirely to the successful and careful management of the society since its inception in 1884. The management expenses, which cannot exceed 10 per cent. of the premium income, have never come up to this allowance. The business being carried on under a system of mutual self-help, each member doing his best to promote the interests of the society, has combined to make it one of the most successful societies of its kind. Prospectus and all further information, from Mr. Bertram Sutton, Secretary, 33, Chancery Lane. W.C.

Letters, Notes, and Answers.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

ANSWERS.

ABERDONENSIS.—Formerly, when C.M. was a necessary accompaniment of M.B., the former had no distinctive hood. The same now applies to Ch.B.,; in Aberdeen, Ch.M. has been assigned a hood of white silk lined with crimson silk. The shape of the hood indicates the university.

BRISTOL.—We are advised that the simplest and most reliable sphygmomanometer is either Martin's modification of the Riva-Rocci or Leonard Hill's. Both are fitted into a box, and are easily carried about.

LETTERS, NOTES, ETC.

THE STORAGE OF REPRINTS.

DR. S. G. SCOTT (Oxford) writes: Envelopes are cheaper than portfolios and quite efficient. I use the strong large envelopes in which the *Proceedings of the Royal Society of Medicine* come to me. These hold all reprints I have at present, except those from *La Cellule* and the *Philosophical Transactions of the Royal Society*. They also cost me nothing.

TELEPHONIC COMMUNICATION WITH HOSPITALS.

DR. RALPH W. LEFTWICH (London, S.W.) writes: What a pity it is that your paper is not more widely read! The lay press has been almost hysterical in lauding the wisdom of the committee of the Guernsey Hospital for introducing telephonic communication between infectious patients and their friends; but the idea is over twenty years old. A reference to the BRITISH MEDICAL JOURNAL for October 28th, 1882, will show that under the heading "The Telephone *versus* Infection" I made this very suggestion.

FOREIGN BODIES IN THE BOWEL.

MR. A. R. MCCULLAGH, L.M.S.S.A.Lond. (School Medical Officer, West Hartlepool), writes: On August 15th I was called to see a little boy who had swallowed a halfpenny. I found it had passed into the stomach. Three days later I was again sent for to see the same boy as he had swallowed another halfpenny. I found that this also had passed into the stomach. I instructed the parents to give him dry bread, porridge, very little water or liquids of any sort, and on no account to purge him. He suffered no pain of any sort and did not exhibit any untoward symptoms at all. Exactly six weeks after swallowing the first coin he passed both halfpennies together in the same motion. Both coins were much discoloured and seemed very thin and smooth.

THE RULE OF THE ROAD.

DR. WILLIAM EWART (London) writes: Regulations have their history: that of our present traffic is quite modern; but customs are immemorial. When, as in this instance, two customs are in complete opposition, they cannot claim like origin from correct instinct and sound reason. Our own seems to possess the better claim to both, on the physiological foundation of "handiness," which means right-handedness, whether in tackling the horse or a foe. This applies to both riding and driving, though this vexed question is generally discussed in connexion with the latter. As horses came before carts, and riding before roads, we might, perhaps, learn more from the horseman than the driver: he still leads our military transports, and probably led the custom in driving. For reasons of right-handedness, the universal rule, except, perhaps, in the Far East, is to mount from the horse's left side. At that stage the left side of the road is always for him the near side. If his journey lies ahead, he need never leave it, and is still on the proper side of the road for dismounting. Should it lie the other way he crosses the road, and is still on the left side. As he starts so he rides. The other custom is less direct: the first thing it makes him do is to change sides.

TREATMENT OF WHOOPING-COUGH.

L. writes: The reply of "M.R.C.S." to Dr. Bain's inquiry is interesting, since he says a full dose of potassium bicarbonate was given before each paroxysm of coughing with the desired effect. Under similar circumstances I was led in some obstinate cases to use CO_2 gas, for inflating the rectum as recommended by Dr. A. Rose in the *New York Medical Journal*, November 30th, 1895, and in each case I was greatly impressed by its superiority and ease of application. The recommendation of "M.R.C.S." seems to me to be tantamount to an inflation of the stomach with CO_2 instead of the rectum. Professor Starling classifies CO_2 originating normally in the tissues as one of the important hormones, and one that is a factor in the induction of normal sleep.

THE FUNCTION OF THE PERIOSTEUM.

DR. W. J. RUTHERFORD (Swindon, Wilts) writes: The views expressed by Sir W. Macewen, and given in the summary of his address on bone development (BRITISH MEDICAL JOURNAL, September 28th, 1912, p. 766), appear to be somewhat reactionary, both as to his idea of the change of type of one form of adult tissue cell to another (chondrocyte into osteoblast), and also as to the complete impotence for osteogenesis of the periosteum. These views are displayed in his recently published booklet on *The Growth of Bone* (1912) at greater length than is possible in the report of a lecture demonstration; but it seems evident that, to some extent at least, he has been anticipated by an earlier worker in the same field. Intermetamorphosis occurring between adult tissue cells, although it might have been an idea acceptable to Ovid and to the elder Pliny, will probably be repudiated by every one acquainted with the concepts of general biology, but with this I do not intend to deal.

It appears to one studying Sir William Macewen's work that the reactionary attitude he has adopted towards this harmless, necessary tissue and its function is more apparent than real, and is due more to a matter of terminology than anything else. Where the majority recognize two layers—an outer fibrous and an inner cellular layer containing osteoblasts and functional in bone formation—Sir W. Macewen seems to confine his idea of the periosteum to the outer fibrous "limiting" layer, and probably would class the deeper layer of the periosteum as the most superficial layer of the bone. If this is a just paraphrase of his view in this matter, it cannot be seen where he has fallen out of line with accepted teaching except in the matter of words and names—things sufficiently barren in themselves.

If otherwise, then, as has already been stated, he has been anticipated, for in the seventeenth century Clopton Havers—whose name is sufficiently familiar—published a little work called *Osteologia Nova*, and devoted considerable space to a discussion of the probable function of this membrane. Even if it were admitted, he argued, that the periosteum serves no useful purpose at all, yet Nature, being elegant in all her parts as well as provident, "it is for decency"! This is about the most extreme way imaginable of formulating the anti-osteogenetic position, and the idea of the periosteum acting as a sort of physiological fig-leaf to the otherwise naked bones has something peculiarly delightful about it.

INFREQUENT ACTION OF THE BOWELS.

DR. W. H. PARKINSON (King's Lynn) writes: The following case, which has been under my notice for the last twelve months, presents certain features which are, I think, sufficiently uncommon to make it of general interest. William P., aged 25, who was under my care for severe headaches, informs me that for the last eighteen or twenty years he has not had the usual daily evacuation of his bowels. After two or three days of constipation he will have one or two normal motions, followed the next day by profuse watery diarrhoea. This is succeeded by two or three days' constipation, and so the cycle recurs. This series of events occurs with great regularity, and is quite unaffected by changes of diet. He is in perfect health, and there is no reason to suspect that there is any intestinal growth which might account for the alternate diarrhoea and constipation, because the history is too long, and, moreover, there is no evidence of any decomposition of the intestinal contents. I take it to be a case of unusual rhythmical contraction of the muscle of the bowel wall. Rhythmicality is a common physiological phenomenon. The heart, diaphragm, and menstrual cycle are familiar examples of it, while the intestine itself usually exhibits rhythmical movements of two kinds: (1) Pendulum-like movements; (2) peristaltic movements. I believe that in this instance the peristaltic movements gradually increase to a maximum and then sink to a minimum, which is followed by another increase, and in so doing exhibit a third variety of rhythm.

A CORRECTION.

DR. FRANK MOXON (London) writes: I shall be much obliged if you will kindly give notice of the error in my article on the treatment of 1,305 London County Council school children at Moorfields Eye Hospital, published in the JOURNAL of October 19th, 1912. The error was pointed out to me through the courtesy of Mr. A. Hugh Thompson, Ophthalmic Surgeon. The error was in my use of the term "isometropia" in the table classifying the errors of refraction. I had used the term wrongly, and the cases classed under that term should have been classed along with the cases of anisometropia.

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